THE AMERICAN SCHOOL AND UNIVERSITY

A YEARBOOK DEVOTED TO THE DESIGN, CONSTRUCTION, EQUIPMENT, UTILIZATION, AND MAINTENANCE OF EDUCATIONAL BUILDINGS AND GROUNDS

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Foreword

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SCHOOLS and school authorities are urged everywhere to meet sympathetically the demands of appropriating bodies for the utmost efficiency and economy in all public activities. At the same time they should stand unflinchingly for the maintenance of that educational service which helps to sustain morale and to increase understanding of the many difficult problems now confronting the American people.

This country has millions of unemployed men and women whose spirit is threatened by idleness and deadly discouragement. For many of them the schools and their various extension facilities are essential agencies for combating these tendencies. Otherwise children would be losing the opportunities which we all owe them, an obligation fully justified by the increasingly difficult demands upon an enlightened citizenship.

The schools should make every effort to have the details of their budgets and activities thoroughly and intelligently studied and understood.

Educational employees should continue to seek new and better ways of doing the necessary work at the least possible cost. Notable progress in this direction has been made.

Salaries should be commensurate with those of other educational professions.

When millions of men and women, old and young, are attempting to equip themselves to get or to hold jobs, the schools should not be permitted to decrease effective service in technical, business and other vocational fields. When these and other millions are in greatest need of finding in our schools the only recreation they can afford for themselves and their children, and one of the few opportunities for retaining their faith in organized society and its ability to emerge from the slough of despond, the schools must not fail to meet their traditional obligations to the nation.

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Section I

BROAD PROBLEMS OF EXPANSION AND ECONOMY

Now Is the Time to Support Education

By GEORGE DRAYTON STRAYER

Professor of Education,
Teachers College, Columbia University

IN many communities and in a majority of the states of the Union there are proposals for retrenchment in the support of public education. No one would disagree with those who demand that we secure a dollar's worth for every dollar spent in the support of the schools. We must, however, give serious consideration to the special need at this time for continuing the support of our schools.

Why the Cost of Education Has Increased

Schools have increased in cost because of increased attendance—an increase that is out of proportion to the increase in our population. Costs have gone up because this increase has been much greater in the upper part of the school system than in the elementary schools. There were approximately one million boys and girls in high schools in 1910, while by 1930 the number exceeded four million. We pay more for education because we have better-educated teachers; because we have built and equipped safe and comfortable buildings; because we have longer school terms; because we have been willing to consider the health and physical education of the children; because we have accepted responsibility for educating those who are handicapped; because, in general, we have sought to equalize opportunity for education in a manner that will enable boys and girls and the youth of the land to achieve that which their intelligence and ambition and character make possible.

Shortsighted Economies Are Proposed

Those who insist upon retrenchment suggest that these improvements in public education are after all not very important. They propose that we may get along without adequate schoolhousing for boys and girls. They suggest that it is good economy to drop our program of maintenance and repairs and pile up exorbitant costs in the years which lie ahead. They seem to believe that children can get along in school without books and educational supplies. They do not seem to hesitate in their proposals to lop off physical education and health service. They sometimes advocate restricting the curricular offerings of the schools to the so-called fundamentals. Some are so crude in their view of the social situation which confronts us as to suggest that savings due to lack of attendance are an advantage to the community.

It is possible in some areas to propose that fees be charged for night schools or that they be closed. The movement for continuation school education is so little understood as to make acceptable to many the notion that these schools can be closed without injury to the boys and girls who are registered in them. One economy recommended by some is the substitution of poorly equipped teachers for those who are well trained. In other quarters the statement is made that salaries can be reduced by as much as thirty per cent without interfering with the quality of education provided. Teachers are being asked to accept larger classes—in some cases so large as to result not only in an impossible teaching situation but also in actual physical discomfort to those crowded into the rooms.

The Advantage of an Equitable System of Taxation

Contrasted with the situations in which these ill-considered retrenchments are proposed are those communities in which education is still being maintained at a high level of efficiency. It is true that in many cases these communities or states are fortunate in the amount of their economic resources and in the procedures which they have developed for the financing of their schools. It is equally clear when one studies the situation that they are able to maintain their schools because they have developed an equitable system of taxation and one that produces revenue adequate for the support of state and local government.

The difficulty in many communities is the dependence upon the general property tax. The burden, resting as it does mainly upon real estate, has, for some embarrassed taxpayers, actually become too heavy to bear. In this situation the

response should be not to close schools nor to render them less efficient, but rather to study the possibility of developing a better revenue system and to consider the possibility of greater participation by the state in the support of the schools.

What Can Be Done

Well-developed principles both for the revision of state tax systems in the light of the present emergency and for the participation of the state in the financing of education are available. New York, Maryland and Missouri offer outstanding examples of recent legislation. It has been found possible to relieve the burden on local property and to equalize a program of education throughout the state. Even the large cities in the state of New York receive a very considerable part of the means of support for their educational programs from the state treasury. The state does not enter to restrict the community but rather to guarantee a certain minimum program to all communities. The program is based upon revenues adjusted in such manner as to bear upon the people in all localities at the same rate in relation to their taxpaying ability.

Citizens who wish well for their communities and who believe in the significance of public education should insist upon the creation of commissions to inquire into the possibility of better financing for their schools. In every case men competent in school administration, in taxation, and in government should be enlisted in the study of the problem and in the development of recommendations for remedial legislation.

Responsibilities Must Not Be Avoided

It is alarming to propose retrenchment which is to interfere with the efficiency of the school system merely because the revenue system needs to be reformed or because it is essential that the state participate in larger degree than heretofore in the support of the schools locally. The situation is critical. If our democracy is to be maintained, we must provide men and women with the knowledge, the insight and the ideals necessary for its perpetuity. We must have schools that do much more than provide opportunity for the development of knowledge and skill. We must have schools in which we seek to develop men and women who love liberty, who seek justice, and who are willing to sacrifice personal advantage to the well-being of the whole group. If our society is to endure, we must have the kind of teachers and the sort of curriculum that will produce a citizenship devoted to the attainment of social justice.

Our schools cannot avoid this larger responsibility any more than they can escape the necessity of dealing with an ever-increasing percentage of the total population. The difficult problems of our society must be solved, and they will be, in one way or another. Boys and girls of secondary school age must remain in school. There is no work for them to do under existing economic conditions, and there is no prospect that there will be work in the near future.

It is in a situation like this that it is proposed to neglect public education. It is with this type of responsibility that some would have us reduce salaries in such measure as to eliminate the abler teachers and keep only those less well qualified. The situation demands teachers who are more than drill-masters. Men and women at work in our schools have the responsibility of developing that insight and those ideals which will make possible the regeneration of our society. We need not plead for the maintenance of salaries but rather for the maintenance and development of our civilization.

Adults as Well as Children Are Affected

We are compelled to call the attention of our public to the importance of continued education for those who are no longer enrolled in full-time schools. Whether we like it or not, unemployment is here and is likely to continue. There is an opportunity in our work with youth and with adults for a more significant consideration of the problems fundamental to our political and social life than is possible with the lower age group.

But we must not neglect the education of children in the elementary and secondary schools. These are the years in which children receive their birthright or have it denied to them. We must view with alarm any diminution in the effectiveness of the attendance service. Absence from school is related positively to an increase in delinquency. The physical well-being of children now will measure in considerable degree their health and vigor in adult life. Special opportunities for boys and girls who are handicapped are more certainly required during a period of depression than during a time of prosperity. The issue before the people of the United States is not "Can we afford to maintain schools?", but rather, "Can we afford not to maintain and improve them?"

The Functions of the Schools Must Be Stressed

We are confronted with a serious social crisis. Our public needs to be informed concerning the meaning of education in our democratic society. Men everywhere need to become more conscious of the necessity of maintaining the school service in order to preserve their social inheritance. It is high time that we call upon our people to study the problems of taxation and of school support, to the end that our program may be improved.

We must realize the necessity of support for public education even though it may involve heavy burdens and even privation. It is only through education that we can hope to insure to ourselves and to posterity life, liberty and the pursuit of happiness.

The Advantage of a Long-Range Building Program

By CHARLES A. RICE

Superintendent of Schools, Portland, Ore.

THE necessity for a long-time building program was forced upon many communities during the last decade because of the fact that during the World War little building was done. While plans were being made to catch up, after a suspension in building for eight or ten years, in many cases they were projected to provide for future needs for an equal period of time or even longer. During the lull in building there was generally a steady growth in population, and portable buildings were erected to provide for the increased enrolment. Later the demand came to replace these portables with modern buildings. This replacement in itself required quite an extended project. Now other cities have come to recognize the wisdom of a long-range program. It may be required because of the city's growing school population, or because of the necessity of converting an antiquated school plant into a modern one, or for both reasons.

The building department in the average school system is not organized to accomplish in a year or two all that must be done to meet such needs. It takes at least a year to provide a site, draw plans for a building, let the contract and erect the structure. The work requires careful inspection. If the number of buildings under way at any given time is too large and the work is rushed too fast, the result may be poor workmanship, a waste of money and unsatisfactory buildings in the end. A building program extended over a ten- or fifteen-year period gives time to check the work at all points. Carried to a successful conclusion, it results in economy and efficiency and in the best interests of the general welfare.

Factors to Be Studied

A school-building program requires careful thought and planning and should not be launched without considering all factors that are pertinent. Among these are the probable growth of the city in the future, the number of buildings adequate to meet the needs, their cost, the source of funds and how they are to be raised, the replacement of present obsolete buildings, the degree of cooperation that may be expected from the taxpayers, their ability to pay for the kind of school buildings required by the type of school organization, and other factors. A survey of the entire city is necessary to determine what projects should be undertaken in the early part of the program and which ones may be deferred until later. The financial arrangements should be such that it will be possible to increase the amount to be expended in times of depression when the cost of materials is low, and to slow up the program when materials are high.

A long-time program determines not only what schools are to be built, where second or third units are to be added and the order of their priority, but also the means of financing such a program—whether by the issue of bonds or by a special tax levy. It is very easy to minimize the importance of this latter point, especially if the authorization for raising the funds must have the approval of the tax-paying public at an election. No program, no matter how well planned, can succeed if it is not practical and if it cannot be sold to the people. Publicity, with all the details as to the needs of the district and the facilities and conveniences required to make the school system function, must be given out.* If this is not done successfully, an adverse vote of the taxpayers may stop the program completely. If the facts are given frankly and fairly, an informed and discerning public will cooperate.

Past, Present and Future Developments Must Be Considered

Often a survey by a committee of outside experts is advisable. The findings and recommendations of this committee may be necessary to give backing to the program. If the committee and the local group are in accord, it means much to the undertaking. All of the information that can be secured from every possible source should be put before the survey committee. This information should include the facts concerning the growth of the city in recent years, covering both the city as a whole and its different sections. Data can be secured from the public service corporations and from the city departments, the gas and electric light and power companies, the telephone company, the water department, and other organizations. Their programs are usually projected into the future and are based on facts and statistics that are of value in laying out a school-building program.

A fifteen-year program is about right as to length, although a fifteen-year look ahead is fraught with many difficulties. Of great assistance is a look into the past to determine what districts have had a rapid growth and what ones are likely to grow rapidly in the future; also which ones will grow slowly and in which ones growing business and industry will crowd out residences, so that the demand for school facilities will diminish as time goes on. It would be a mistake to erect a new school building in a section where these latter conditions exist. In re-

* See the article on "Publicity for New School-Building Projects," page 21.

placing a building, a study should be made to determine its new location. It may not always be desirable to rebuild on the same site. A new site may be selected in the interests of economy and future distribution of the population of the community. Often in a section where the population is diminishing, schools can be combined, with one school replacing two, or two schools replacing three. At such a time it is possible to correct mistakes in the location of buildings which were made when districts were just opening up and it was difficult to foresee future developments.

Cooperation with Other Governmental Units

The school-building program should be laid out in conjunction with the improvement programs of other governmental units. This requires close cooperation with the officials in charge of all departments. If an agreement is reached covering all activities of the community, it assures the support of all groups. If the "go it alone" plan is adopted, there may be a lack of harmony and cooperation which will result in failure. The necessities and requirements of the city as a whole should be considered by a city planning group. This study should include present facilities, not only of the schools, but of parks and playgrounds, bridges and boulevards, and municipal buildings of all kinds; the needs of all departments should be surveyed.* If the different units work separately and adopt independent programs, it may easily happen that there are too many projects under way at the same time, involving a financial outlay too burdensome for the taxpayers to carry. If a joint program is followed, its effect is to stabilize tax levies through the years of the improvement program.

The Public Must Be Kept Informed

The building program should be outlined in detail as far as possible with the facts in command at the time. Full information must be given to the public in order to gain the necessary support. It often happens, however, that conditions change during the term of years which is covered by the project. In such a case there should be a corresponding change in procedure. A program once launched will sometimes have to be revised in certain particulars because of unforeseen conditions, such as depressions, periods of undue expansion, or a shift in population. Such a change in program should be given the proper publicity, including a frank statement setting forth the facts and reasons for the revision.

It is essential in a long-time building program to give consideration to the functional use of school buildings. The buildings should have those conveniences and facilities that best serve the type of local school organization. A study of school organizations should be made in the beginning and a conclusion reached as to whether the type now used is to continue or whether a change should be made. If junior high schools are to be planned for, that fact should be known. If platoon schools are to be inaugurated, buildings adapted for their use should be planned. In the case of high school buildings, it should be determined whether they are to be planned for schools organized on the study-hall plan or on the registration-room plan. A long-time school building program makes it necessary to decide the policy with reference to types of organization to be used over a period of many years.

The Portland Program

The type of organization used in Portland is the platoon or work-study-play. Our building survey was made in 1923 by the Federal Office of Education, of Washington, D. C. The period covered by the program extended from 1922 to 1937, divided into three five-year periods. The schedule provided for the replacement of about 200 portable classrooms, and about 30 obsolete wooden buildings, and for the growth in school enrolment during the 15 years. The new buildings were to be especially adapted to the platoon type of organization, and funds were included to modify existing permanent buildings to meet the requirements for platoon schools. At the present time we have 46 platoon schools, enrolling about 88 per cent of our elementary pupils. Additional funds were also provided to purchase grounds where sites were too small. During this period we have added 126.37 acres to our school playground area. The recommendation was a minimum of 5 acres for each elementary school, and 10 acres for each high school.

The program called for an expenditure of approximately $15,000,000, or $5,000,000 for each five-year period. The money was to have been provided by the sale of bonds, which, according to our law, must be approved by a vote of the taxpayers. The plan was carried out in part; $5,000,000 was voted for the first five years, and $4,500,000 for the second five years. To finance the third five-year period, our Board has abandoned the further sale of bonds and gone to the "pay-as-you-go" basis, asking for a special tax levy of $300,000 each year for the last five years. This plan will doubtless be continued. Our building program is about 80 per cent completed and we have just reached the end of the second five-year period.

* See the article on "The School System and the City Plan" on page 26.

Publicity for New School-Building Projects

By FRANK IRVING COOPER

Architect, Boston, Mass.; Chairman, Committee on Schoolhouse Planning, National Education Association

PUBLICITY for a new school building should present information about the proposed building to the public. The object of the information is, first, to interest the citizens; second, to secure their good-will and approval; and, third, to win their support and votes. American voters intend to provide for the proper education of their children. Lack of support usually means that the voters have not been informed about the real needs of the schools. The publicity should therefore describe the accomplishments, purposes and plans of the school or schools to be relieved, and should make plain the fact that the lack of sufficient accommodations renders it impossible to perform good work. What the voters wish to know, before they will authorize any appropriation, is when the "sudden" need for a new building developed; how much the erection of the building will increase taxes; why the building program cannot be postponed for another year; and a hundred and one other questions.

Organization

The organization required for a successful publicity campaign must be suited to the locality. It should, however, include the board of education, the superintendent of schools, a publicity committee, and probably a skilled director of publicity.

The superintendent of schools should supply the facts about the schools which are necessary for the campaign. He should be the advisor of the committee, but not its chairman. The success or failure of the campaign should never lie at his door, for there are some who will believe that he is working for his own personal benefit.

All Civic Groups Should Be Represented

A large committee representing all the groups and organizations in the community is often advisable. Cooperation should be asked from the civic organizations such as Rotary and Kiwanis, from the Parent-Teachers Association, from alumni, etc. No important group should be unrepresented, because it might become a nucleus for opposition to the campaign. Subdivisions of the committee should include a Speakers' Committee, composed of leaders of the various civic and other organizations; a Committee on Written Material, consisting of newspaper representatives and editors of local and school publications; a Committee on Maps, Pictures, Slides, Charts, Posters, etc., which will get its material from the school survey described below; and a Committee on Parades and School Exhibits.

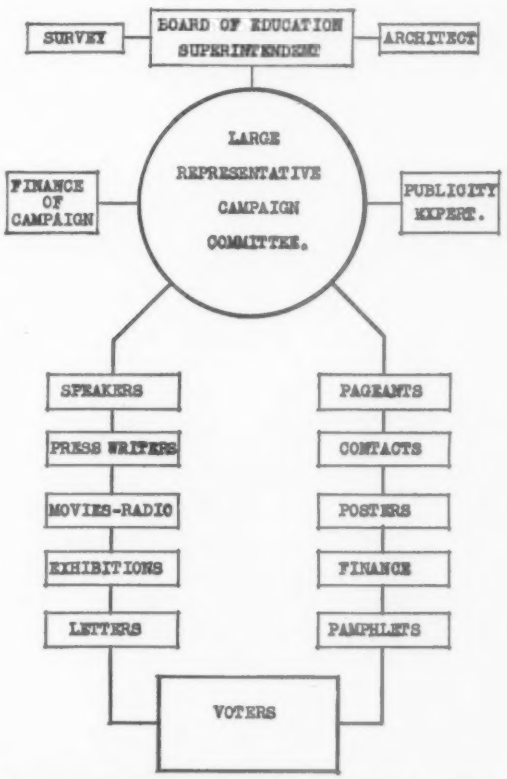
Financing the Campaign

Funds for a publicity campaign for school buildings should come from the people, from the Parent-Teachers Association, from the alumni, or from public-spirited citizens who are interested to help the schools. Teachers and pupils should never be asked to contribute financially.

Methods of Procedure

Special campaign publicity work should follow organization. While general publicity may arouse the people to the needs of the schools, an active opposing faction may negative the work which has been carried on. Intensive campaign publicity is an offensive to overcome all such opposition.

A preliminary sounding will usually show what opposition to expect, the arguments of the opposers, the sources of the opposition, what persons, if any, are antagonistic to the schools, and whether or not harmful rumors are afloat.



A SUGGESTED FORM OF ORGANIZATION FOR A SCHOOL BUILDING PUBLICITY CAMPAIGN

This preliminary sounding may suggest answers to criticisms which might become important enough to defeat the purposes of the campaign if left unanswered.

The Advantages of a School Survey

Forced to lay out a campaign of education for the voters, school authorities are likely to find that they have little information on how to organize and carry on such a campaign. They are called upon to explain a situation which had seemed to them self-evident, but which the voter does not realize at all because he has not been kept informed. Under these circumstances the first step to be taken is to have a survey of the school system made by an educational expert, in order to obtain reliable data on which to base arguments for new buildings. The survey should criticize constructively the present school system; analyze in detail existing conditions; sum up pupil achievement; set forth the system's educational policies; and present a definite program for future work and improvements.

The Use of Survey Material

A school survey will forecast the growth of the community and show charts of population growth over a period of time. These charts may be supported by figures of economic growth. Pin maps showing the exact location of the homes of individual pupils and the positions of the school buildings used by these pupils may reveal overlapping districts and indicate the wisdom of consolidation, with its attendant economies in administration. Pin maps will show what districts are uncared for and where new buildings are needed to reduce travel distances or to eliminate dangerous crossings at which traffic accidents to pupils may occur. Pin maps may also disclose desirable locations for new school sites. Diagrams will show the inadequate size of existing school playgrounds.

A survey will reveal whether some teachers are overburdened by having too many pupils in their classes. It will show the present size and schedule of classes and the reduction in the size of classes which would result if there were a new building. Charts should be prepared showing the comparative values of selected educational items, the undue expense of upkeep and administration of some of the school buildings, and the excessive cost of renovating them. They should also show what proportion of the total municipal expenditures is devoted to administration and upkeep of school buildings, and how these figures compare with those of similar communities. As effective supplements to statistics, photographs of inadequate, insanitary or dangerous existing conditions may be used. Much of the survey report will be too technical for the layman to understand, but from it may be taken material directly helpful in a publicity campaign.

Avenues for Publicity

Several avenues are open to a publicity campaign for school-building projects. The local press usually considers material on the subject good copy. It must, however, be well written, and the services of a skilled publicist should be secured.

The proper preparation of copy is a necessary feature in any effort of this kind. Many a potentially good contribution is rejected because it is too much trouble to convert it into acceptable newspaper copy. The public is made up of individuals with diverse opinions and living under different conditions. In a printed statement the first consideration is to make a strong, forceful announcement. The first sentence of every paragraph should catch the eye. The public can be depended upon to read the small type if what it says is interesting and to the point.

Newspaper copy must have news value. It must not tell facts in encyclopedic fashion. The personal or "human interest" factor will always attract attention and make a readable article. This treatment, however, should be controlled by the locality and kind of newspaper. Possibly the press will use photographs of existing school activities and conditions. It may print the form of ballot to be used by the public in voting on the new school. Illustrations, cartoons and slogans attract attention when the general public is to be interested. Newspaper articles may in turn bring forth editorials and letters from interested citizens. All of these can be reprinted and distributed to the voters.

Using the Schools as an Avenue of Publicity

Another avenue of publicity is by way of the pupils, who should be treated as peers and partners. They should be taken into the confidence of the committee and their enthusiasm aroused by having the need for the new building thoroughly explained. The art class may furnish posters and do unlimited supplementary work for the sub-committees. Public addresses to the citizens may be made by the older students. English classes may help by writing letters to parents and citizens. On voting day, the pupils can say to their parents, "This is voting day, and we need a new school building." Parades and pageants of school children also help create interest.

One of the most important avenues of school publicity is the school paper, which may well devote entire issues to dignified and technical articles dealing with the school situation. The "new-school campaign" issues should be distributed widely. The printing classes may give valuable assistance.

The superintendent should explain to the principals and teachers the publicity committee's plans and programs, and he should emphasize the importance of having the parents and the public

visit the schools and realize under what crowded conditions the children are studying.

Plans of the proposed school building should be placed on public view in different sections of the community some time before the date set for voting, so that when voting day arrives there will be a thorough understanding of the proposed new school building.*

Many other avenues for publicity are open to a school-building campaign. Folders, circulars and follow-up letters, perhaps containing reprints of newspaper articles, may be mailed or distributed to the voters. For this purpose it is advisable to check street maps with election records. Billboards, radio, movie theaters, displays in store windows, auto stickers and placards may legitimately be used to advertise a school-building campaign.

Explaining the Financial Program

A publicity campaign for a new school must emphasize the financial side of the project. It should show the comparative taxes and wealth of the community, the cost of schools in other cities and towns, and the debt that will be incurred by the building program and each taxpayer's share in this debt. The method of financing adopted and its advantages should also be explained to the voters.

Summary

Publicity is a selling campaign; it should be well organized. There is always one *best* way; and an effort must be made to find it. In military affairs the General plans to capture and hold a position. In a school-building campaign, public good-will is the objective which must be captured and held. The campaign can be no hit-or-miss affair. Personal issues and political complications must be avoided. Oakland, Calif., recently conducted a successful school campaign based on the following principle: "Tell the voters honestly, tell them clearly, tell them often." With such a program success is bound to follow.

* See page 56 for a description of a novel method of presenting floor plans to the public.

Depreciation—a Factor in Public School Administration

By FRED ENGELHARDT

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THE element of time is associated with materials and services in such a manner as to complicate many of the business administration practices of public schools. The variations in the service-life of materials purchased, personnel employed, and services contracted for, have brought forth conflicting theories as well as marked differences in current school business procedure.

Services such as insurance protection may be purchased for one-, three-, or five-year terms, and as a rule the premiums are paid in advance. In some states the pension laws obligate local school districts to budget for all time an annual sum for retirement-fund purposes, the amount to be paid being fixed by law. In the first case, the service-term is agreed upon by contract, while in the latter instance the service-term becomes more or less a perpetual requirement.

Boards of education may contract with a superintendent of schools for a three- or four-year or a longer term of service. Teachers may be contracted with for the period of a year, although in reality the local obligation to employ them may be indirectly extended by tenure laws until the teachers leave or are ready to retire. This latter mandate may continue even though the teachers' services may depreciate considerably during the period of employment. The problem of maintaining a high order of efficiency in the work performed by each member of the employed staff, and the problem of avoiding depreciation in the services rendered, are among the every-day tasks of public school administration.

The Service-Life of Materials Used in Schools

Pencils, crayon, paper and other articles used in schools are purchased with the express knowledge that their service-life is limited and that, however carefully selected and handled, they will be consumed in the process of use. This service-life factor is what differentiates supplies from equipment.

A school bus or an automobile may be bought to serve a useful school purpose and yet, in spite of careful handling, its term of useful life will be relatively short. On the other hand, chairs, desks, and much of the fixed equipment in schools are known to last for a very long time; such articles may serve one generation of school children after another. Normally, each book and each item of instructional equipment purchased has a relatively long service-life, yet progress may bring

forth new and better teaching tools. As a result, equipment on hand may grow obsolete and lose its value long before it is worn out.

The cost of replacement in the case of the materials referred to above is as a rule not so great but that adequate provision may be made for it each year in the budget, with the result that payments may be made from current funds. For this reason, depreciation accounts for school equipment have been kept only in rare cases. Yet ways and means of extending the life of equipment and of keeping it in maximum serviceable condition are an important task of public school business management. School executives have not yet learned how they may use depreciation accounts to provide a check against the accumulation of equipment which has outlived its usefulness.

When Cost Complicates the Problem

In the case of school buildings, however, the factor of cost enters in to further complicate the problem of business administration. School structures have a long-time service-life, and in many school systems construction costs result in sums far in excess of the total annual current expense budget. Du Pont holds that forty years represents the life cycle of a school building.[1] Strayer and Haig have shown that the school buildings in New York State have served for an average of seventy-five years.[2] A review of the data in the table shows that a relatively large number of elementary classrooms and school buildings have continued in use in Minneapolis and Philadelphia even after they are fifty years old. It is believed that modern school buildings will approximate or possibly exceed the average of three-quarters of a century of service-life.

AGE OF ELEMENTARY SCHOOL BUILDINGS IN MINNEAPOLIS AND PHILADELPHIA IN USE AND CONSTRUCTED PRIOR TO 1910

Years Old as of 1931	*Minneapolis*[a] *Number of Buildings*	*Philadelphia*[b] *Number of Classrooms*
Unknown	—	108
90 and over	—	75
80–89	—	58
70–79	—	132
60–69	5	402
50–59	23	713
40–49	10	433
30–39	13	819
Total	51	2,740

[a] From an unpublished survey of Elementary School Buildings of Minneapolis, made in 1929.
[b] From Philadelphia School Survey, 1923.

When school equipment is discarded because it is no longer serviceable or because it has become obsolete, it is replaced as a rule by equivalent goods of approximately the same cost. In replacing a building, however, particularly one that has been in service for some time, the old structure is seldom duplicated. In fact, the new building is rarely built on the same site. Generally, by the time buildings are discarded, a reorganization of the schools may have taken place, requiring replacement by a completely new type of structure. In other words, much of the expenditure involved in school buildings has been for new construction rather than for the replacement of old discarded schoolhouses. It must be kept in mind that when actual replacements in plant have been made, the cost of the modern plant is so great in contrast to the original cost of the property replaced, that in many cases over 75 per cent of the structural expenditure must be accounted for as additional capital outlay rather than as a replacement disbursement. These practical issues create problems for the accounting and management of depreciation of school buildings that are very different from those that exist in the case of school equipment when considered as a whole. It may be that when modern school buildings are ready for replacement, the points referred to will not apply in the same way as they appear to apply today.

Responsibilities of Administration

In this brief review, it may be well to select and catalog the seemingly basic responsibilities having to do with depreciation that public school administration must assume and plan for. Obviously, the practices to be followed as they apply to personnel and contracted services will be different from those that apply to material goods. This article is considering the latter aspect of the problem.

It is hardly necessary to point out that good management endeavors to protect the resources of a school district by reducing the depreciation of school property in every way that is found to be economical. Likewise, management will endeavor to anticipate replacement needs due to depreciation and obsolescence. To do these things requires careful planning and attention to the following factors:

1. The probable service-life of articles. Standards of quality must be considered for all goods to be purchased.

2. The need for adequate instruction regarding the use of property. The necessary instruction should be incorporated in the curricula given to all those who use the goods. This instruction should include the factor of use, the significance of the economical values involved, and the responsibility individuals must assume when an article is in need of repair.

3. The need for properly devised and properly kept accounting records. It is only through available facts that the responsibilities enumerated under 1 and 2 may be fulfilled. That is, through analysis of facts it will be possible to evaluate

[1] P. D. Du Pont, "Schools—Maintenance and Replacement."—*American School Board Journal*, May, 1926, p. 51.
[2] G. D. Strayer and R. M. Haig, "The Financing of Education in the State of New York."—The Macmillan Co., 1923, p. 82.

rates of depreciation, replacement needs, and the effect of managerial practices on depreciation.[1]

4. Economical financial policies. These must be developed and applied to the problems of maintenance and replacement. Each class of goods may require particular attention in this regard.

Reserves for Depreciation

It has been debated for a long time whether public school systems should or should not establish reserves from which disbursements for replacements could be made. There are to be found among competent authorities those who will uphold on theoretical grounds either side of the issue. Yet, in practice, reserves for depreciation are not commonly to be found in public school business records. Accounts for depreciation when kept have been maintained largely to assist management, without the thought of setting cash aside and accumulating a fund to be used for replacement purposes.

The student of educational administration must perceive that plant values, investments and depreciation have a different significance in private enterprise from what they have in public school finance. Plant values in the public school business are important only so far as they contribute to making educational services more effective. The cash values of the school properties are not an investment or a true resource: they cannot be used to raise needed capital; they cannot be classed as liens against outstanding obligations; they cannot be sold with a view to distributing the proceeds among stockholders in case of liquidation.

A reserve for depreciation in a public school enterprise would be accumulated in the belief that it would be wise to have the necessary funds available when replacements are to be made. Some believe that through a process of this kind economies would result. They contend that, if a depreciation reserve were maintained, school districts would be in a better financial position to build when replacements are found to be necessary, for otherwise they might not be able to finance a new structure.

All will agree that school districts should finance out of current income those items of replacement the cost of which will not create hardship on the taxpayers. On this principle, current maintenance needs and the replacement of equipment are taken care of in the annual budget. Small school districts following this practice may on occasion find that the replacement of a boiler, for example, or a school bus, does tax the community very heavily for the year that such an item must be purchased.

Replacing School Buildings

Few school systems in the United States could, however, replace school buildings out of current revenue. To anticipate the replacement of plant needs through an established accumulated reserve at the present stage of public school business administration, the following very vital issues must be faced:

1. Are adequate facts available to help determine the amount to be set aside annually per dollar of plant to be replaced?

2. Are adequate facts available to determine the period a school building will serve before it must be replaced? That is, for how long a term will payments into a reserve fund be necessary?

3. To what extent can management be assured that a replacement fund will be at all adequate to meet the needs at the time when replacement is necessary?

4. What assurance is there that under present administrative practices reserve funds will be properly invested and the principal of the fund left intact until needed?

5. What evidence is there that in public school business the reserve fund practice would result in actual economies?

6. It must be kept in mind that all school buildings are not to be replaced after they are determined to be no longer serviceable. Hence, in many cases a reserve could not be used to serve the designed purpose for which it was accumulated.

In the long run, the practice of setting up reserves of any kind by local civil divisions of a state may be questioned. The national and state governments may do so with some assurance that public interests will be adequately protected. It is doubtful, however, whether a program of cash reserve accumulations would prove economical for school districts. For the time being, more intelligent progress will be made if adequate depreciation-accounting practices are developed and if more satisfactory data regarding depreciation rates and replacement needs are made available, in order that the issues involved may be considered in the light of facts gathered from public school accounting rather than from the discussion of theories and practices evolved from private business records.

[1] Those interested in records for accounting for depreciation and in methods for determining depreciation may consult the following books:

N. L. Engelhardt and Fred Engelhardt, "Public School Business Administration."—Teachers College, Columbia University, 1927.

W. G. Reeder, "The Business Administration of a School System."—Ginn and Co., Boston, 1929.

H. P. Smith, "Business Administration of Public Schools."—World Book Co., Yonkers, N. Y., 1929.

The School System and the City Plan

By HARLAND BARTHOLOMEW

City Planner, St. Louis, Mo.; President, National Conference on City Planning

THE wisdom and necessity of preparing plans for the future development of school systems are becoming more generally recognized.* Many uncertain factors are introduced, however, if no city plan is available to serve as a guide. This is readily apparent when it is realized that the city plan analyzes all factors that will affect the future growth of the city, including the coordination of all physical improvements.

Uncontrolled growth of cities generally results in unorderly economic trends. Their populations are continually shifting and the character of their neighborhoods is constantly changing. New developments take place in outlying sections without any consideration to existing improvements or future requirements. Even a properly conceived city plan is unable to control these conditions unless it is given an official status and its recommendations are consistently followed. The difficulties that will be encountered in preparing a school survey without the aid of a comprehensive plan are immediately evident.

A city plan usually considers and recommends definite schemes for the improvement and growth of six major phases of the city's structure. These are: Major Streets; Transportation; Transit; Zoning; the City's Appearance, or Civic Art; and Park and Recreational Facilities. These phases have a definite relationship to the different factors and elements of the school system.

The Street Plan

A major street plan is concerned with the width and arrangement of main traffic thoroughfares so that the completed system will provide adequate channels for vehicular traffic between all sections of the city. Elementary schools should preferably not be located adjacent to these thoroughfares, since the large amount of traffic endangers the children's safety. Also, the children should not have to cross many of these heavily traveled streets on their way to and from school. A location somewhere near the center of the area bounded by such thoroughfares is desirable. Such factors are not so important, however, in the location of junior and senior high schools. Children attending these schools are older and less subject to traffic dangers, but even junior and senior high schools should be recessed from the immediate vicinity of heavy traffic streets.

The Transportation Plan

A transportation plan deals with railroads and other forms of transportation to and from the city. Areas adjoining railroads are undesirable for school locations, particularly since they are or may be devoted to industrial uses. Furthermore, the smaller children should not be required to cross railroad lines in order to reach the school grounds. Existing and probable future location of transportation facilities are to be avoided in selecting school sites.

The Transit Plan

The routing of street cars and busses for mass transportation movement is considered in the transit phase of the city plan. Since these facilities are usually found upon major streets, they should not be adjacent to elementary schools. They should, however, be conveniently located in relation to high school sites. Many of the students attending senior high schools come from such distances that they are forced to use some form of transit facility. When cities locate senior high schools beyond the developed sections in order that large areas may be acquired, transit facilities must extend from the residential districts to within reasonable distance of the site.

Zoning

Zoning divides a city into a number of districts and regulates the use as well as the intensity of land occupancy within each district. The location and extent of residential, commercial, and industrial districts are thus determined and controlled. The relationship and importance of this phase of the city plan to the school system is obvious. School buildings should be located in residential districts and these sections of the city can only be definitely ascertained where there is a well-drawn zoning ordinance. A district may now contain a large population and require school facilities; yet if it is eventually to be given over to commercial or industrial uses, no expensive improvements need be made upon the existing buildings and consideration should be given to their eventual abandonment.

Another advantage of zoning is that it controls the maximum density of population in residence areas. The probable school enrolment can be determined, and consequently a definite and scientific basis is available by which the school needs in all sections of the city can be estimated and provided for.

The Civic Art Study

The location and character of public buildings and suggestions concerning numerous other factors that will improve the appearance of the city

* See the article on "The Advantage of a Long-Range Building Program," on page 19.

as well as increase the amenities of urban life are considered in the Civic Art study. Obviously, the design, construction, and general treatment of school facilities will materially affect the city's appearance and, if properly handled, will stimulate civic pride. Too often, however, no landscape treatment is provided about an excellent building, and the play area is merely a dusty, uninviting open space. No school-building program is complete unless plans are made for the landscape treatment about the buildings as well as the proper design, screening and planting of the play areas. These factors will not only improve the appearance of the site but will also increase its usefulness and insure additional safety to the children.

The Park and Recreation Study

A park and recreation study is concerned with the provision of adequate recreational areas for all persons. A complete system usually comprises playgrounds, playfields, neighborhood and large parks, parkways, and community centers. Since school grounds should provide recreational facilities, it is essential that a close relationship and coordination exist between the school and park system. Otherwise, a duplication of areas will result, and unnecessary expenditures will be made. For this reason the recommendations concerning school development are often contained in the park and recreation phase of a comprehensive city plan.

Recreation Facilities for Different Age Groups

In studying recreational requirements, the population of any city can be roughly divided into five age groups, each of which has different play interests. They include children under school age, elementary school children, junior and senior high school students, youths who are employed rather than attending schools, and adults. While different types of facilities should be available for each of these groups, there will naturally be some overlapping of use. For example, large parks and pleasure drives will be used by all age groups rather than by any one population class.

Elementary school standards require that the sites be within reasonable walking distance of all children and contain approximately five acres. If all schools within the system conform to these standards, the play requirements of this age group will be cared for, and no additional areas will be necessary. A junior high school site should contain a minimum of 15 acres, and senior high schools should have at least 25 acres. Thus, an adequate school system provides for the necessary recreational needs of two important age groups, and the requirements placed upon the park board will be materially reduced. Since the park officials will not be required to develop playgrounds and playfields, school buildings should be located so as to utilize any existing park areas whenever possible.

Combined School Grounds and Neighborhood Parks

One of the greatest opportunities for coordinating the park and school systems is that of combining elementary school grounds and neighborhood parks.* Both facilities should serve approximately one square mile of residential territory and be located as close to the center of this area as possible. In order to afford effective service, a neighborhood park should contain about twenty acres; but if the two areas are combined, the same acreage will serve both purposes. Although neighborhood parks are particularly essential to provide recreational facilities for adults, the area can be designed so as to eliminate any interference between the two uses. These areas would provide all necessary recreational facilities for a complete neighborhood unit.

Coordination of Recreation Activities

Administrative matters do not directly concern either a school survey or a city plan. Since, however, at least two different boards or organizations should provide the necessary areas for a comprehensive recreation system, a coordination of activities and responsibilities is essential. Experience has indicated that the best results will be obtained if the school board will develop adequate elementary, junior and senior high school sites and permit these areas to be used throughout the year. The same board should also make the school buildings available for community centers or indoor recreational activities that can be enjoyed by all age groups. The park board should develop neighborhood and large parks, parkways and any special recreational areas. Because of its equipment and personnel, this board might also plant and maintain the school grounds, provided, of course, that the cost of this service is properly adjusted. To insure maximum utilization there should be a recreation department to organize and direct all the activities at these various areas.

Advanced Planning Makes Improvements Possible

The increased enrolments in public schools and experience with modern educational and recreational standards indicate that school systems must be improved and enlarged constantly. This can be accomplished only by a preconceived plan which will eliminate duplication and insure the incorporation of every improvement as an integral part of the final system. A complete survey of the existing system and its probable future needs is essential. But satisfactory results will not be obtained unless a comprehensive city plan has also been adopted, and the school plans are coordinated with and related to the other phases of the city plan.

* See the article on "Combining School Grounds, Playgrounds and Neighborhood Parks in Palos Verdes, California," in Section IV.

Section II

DESIGN AND CONSTRUCTION OF BUILDINGS

Architecture for School and College Buildings—

Period Styles or Contemporary?

Period Styles for Character

By GUY STUDY

Study and Farrar, Architects, St. Louis, Mo.

THE success of a school plant is dependent far more upon its architecture than is usually realized. It is from the character of the architecture that the whole building takes its atmosphere. If a building is unintelligently designed and the materials are commonplace and unwisely selected, the finished structure is a failure and its psychological effect upon pupils and teachers is disastrous.

The effect of character in architecture, while indeed forceful, is at the same time a subtle and somewhat indefinite factor. As all architecture derives its quality from the elements of its design, any discussion of architectural character in a building will resolve itself into a discussion of architectural design. This in turn leads us to a discussion of architectural style.

Good Design Is Essential

A school building is well designed when it successfully fills its purpose. The whole school plant should work towards the education of youth and help to cultivate appreciation of the finer things in life. School children spend many hours of their lives in school, and English-speaking peoples have always held the theory that environment has an important influence on the character of

Ernest Sibley, Architect; Lawrence C. Licht, Associate *Photograph by John Wallace Gillies, Inc.*

LUDLUM ELEMENTARY SCHOOL, HEMPSTEAD, N. Y.

Frederick L. Ackerman, Architect

BALCH HALL, CORNELL UNIVERSITY, ITHACA, N. Y.

youth. If the architecture of a school building possesses all the qualities of good design—simplicity, beauty of proportion, grace of line, harmony in the selection of materials and colors, its influence upon youth cannot fail to be elevating. Good architecture inherently expresses dignity and nobility of character.

Many School Buildings Lack Character

Architecture of character creates something more than a mere mechanical, institutional structure. It differs, for example, from modern German school architecture, which seems to be concerned solely with the thought of supplying pupils with

Wm. B. Ittner, Architect

HIGH SCHOOL, GREENFIELD, OHIO

light and air. Most of the recent German schools have been reduced to the most practical and simple buildings possible, whose plan has been evolved not from a study of what we in this country know as intelligent school administration, but almost entirely with the idea of obtaining the largest amount of sunlight. Ornament and architectural detail have been almost completely eliminated. It is evident that architectural character as we use the term is considered of minor importance.

Study & Farrar, Architects

MARY INSTITUTE, ST. LOUIS, MO.

There is unfortunately great lack of unity of thought and taste in many of our school buildings. I attribute this largely to the fact that the architects were not great designers. One must realize, however, that standards are changing rapidly and that there are many more well-designed buildings today than there were twenty or thirty years ago. To my way of thinking, the buildings which have employed one of the period styles have been by far the most successful.

The Period Styles

The decision as to which style to choose for a school located in a residential district will probably be influenced by the style which predominates in the neighborhood, although this should not be done unless the predominating style is good. The Spanish and Italian styles have been used with great success in various parts of the United States, but in by far the greatest number of states the English Tudor and the Colonial styles have been found to lend themselves more advantageously to modern school buildings.

The Tudor Style

If funds are ample, it is probable that no style will produce a more beautiful scholastic building than the English Tudor. Its great masses of mullioned windows lend themselves to the lighting of almost any room. This style, elastic as it is, can be molded to fit the most complicated and elaborate school plan. But it should not be attempted unless it can be done properly. The exterior of such a building calls for a considerable amount of cut-stone work, which naturally runs up the cost. The interior treatment of a Tudor building has been frequently criticized as being somber and dull. While this criticism is undoubtedly just, the atmosphere of such an interior appeals strongly to certain temperaments, and such an interior can be given great charm and character.

The Colonial Style

The Colonial style, on the other hand, lends itself to almost any type of building. If the funds are ample, much stone or marble may be used upon the façade. Even when funds are meager, many beautiful effects can be obtained with brick and wood. There is nothing more effective in a school building than red brick offset by stately white columns, and nothing more attractive than the rhythmical arrangement of Colonial windows and arches. The Colonial style likewise produces the most cheerful and artistic interior possible. The somber, drab atmosphere produced by stained oak is changed into an atmosphere of light and cheeriness by the use of white or grey paint. The classic details of Colonial architecture offer an almost limitless variety of suggestions, simple in their treatment, yet highly effective and artistic in their use.

The Period Styles Perpetuate Tradition

In the development of the youth of our land it is well to acquaint them with the great cultures of the past and to cherish the spirit of the founders of the nation. There is no better way to perpetuate these virtues than by the use in our school buildings of one of the two traditional styles of architecture, the Tudor and the Colonial, which fortunately have become our true heritage.

Modern Architecture for Efficiency

By PHILIP JOHNSON

Director of the Architectural Exhibition, The Museum of Modern Art, New York

"Owing to the architect's design (in order not to spoil a cornice, windows were omitted), an effective ventilation system is practically impossible to install."—From an unpublished report by Carlton Smith, Chief of the Music Division of the New York Public Library, concerning the quarters of the Music Division.

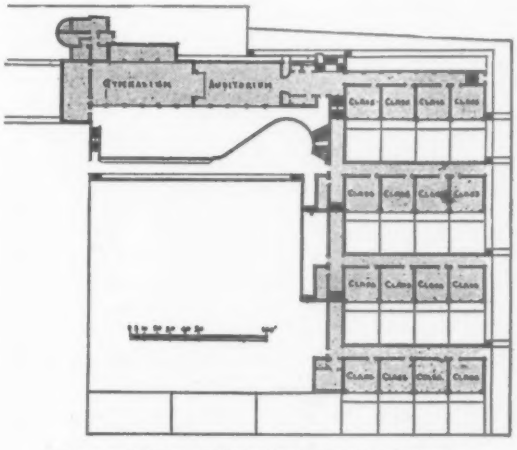
SIMILAR stories about our school buildings are only too frequent today. Architects have been more concerned with the system of design which they learned by heart in architectural school than with the functional needs of the building which they were planning. The results were bad lighting, bad planning and high costs. Carefully spaced Georgian windows or Gothic slits did not afford sufficient light for modern interiors; monumental vestibules and dark corridors took up too much space; libraries, offices, gymnasiums and classrooms were all forced into a symmetrical shell regardless of their varying size, shape and function. Classical cornices or cut-stone window mullions, marble staircases and Georgian belfries ate up the appropriations of the community which might have been applied to teachers' salaries.

It should be only the past that we are thus describing. These are, however, conditions still existent, especially in our larger universities and colleges where great sums have been spent on making the campus uniformly Gothic or uniformly Georgian, at the expense of light and convenience, but primarily at the expense of other functions of a college which might benefit from the money poured into the buildings.*

School Building Standards Have Been Improved

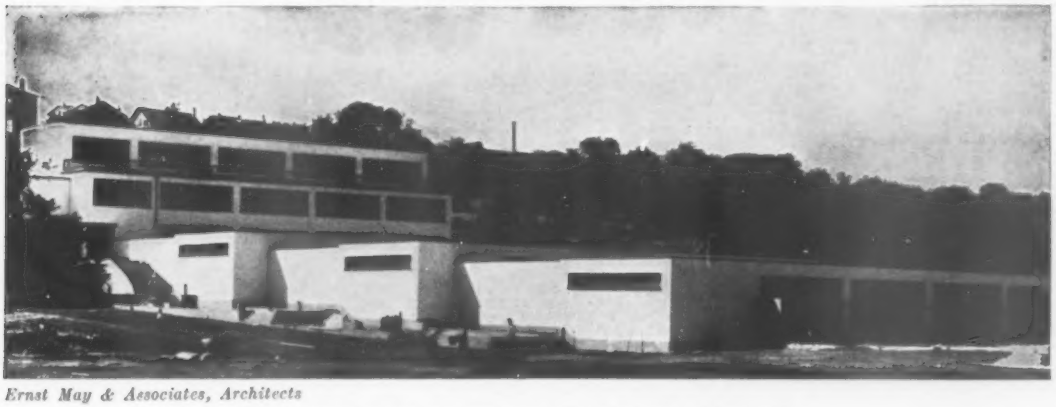
In general, however, recent years have seen more functional planning in our school buildings.

* See the paragraphs by Alfred H. Barr, Jr., on page 33.



PLAN OF THE FRIEDRICH EBERT SCHOOL, FRANKFORT, GERMANY

Unfortunately this is not chiefly because architects have at last realized that such a complicated building as a school must be designed with the functions and arrangement of the rooms foremost in mind, but because the clients, in this instance the school boards, assisted by such agencies as the Institute of Educational Research, have realized the necessity of sound planning. Standards of lighting and general efficiency have been raised enormously until there are today certain minimum requirements which every contemporary school building must meet. And here is where the paradox of building schools in period styles appears. If the copied style is correctly used, with real medieval stone masonry or proper Georgian fenestration, the building becomes uneconomic in execution and functionally inefficient as a modern school. If, on the other hand, the



Ernst May & Associates, Architects

FRIEDRICH EBERT SCHOOL, FRANKFORT, GERMANY

period style is freely adapted to house new schools functionally, as in the case of most public school buildings in this country today, there is no resemblance in letter or spirit to the original style.

The greatest difficulty is still the architect. He too often clothes the plan given him by his clients in exteriors more or less expensive according to the amount he can squeeze from the community funds. His repertoire of designs is no longer confined, it is true, to Tudor or Colonial; he may substitute "modernistic." But the underlying ideas are the same—monumental entrance towers, fancy brickwork, $50,000 site improvements, bad ornament in expensive stone, either traditional moldings and cornices, or "modernistic" motifs borrowed from the Decorative Arts Exposition of Paris, 1925.

The Modern Architect Is an Indispensable Aid, Not a Luxury

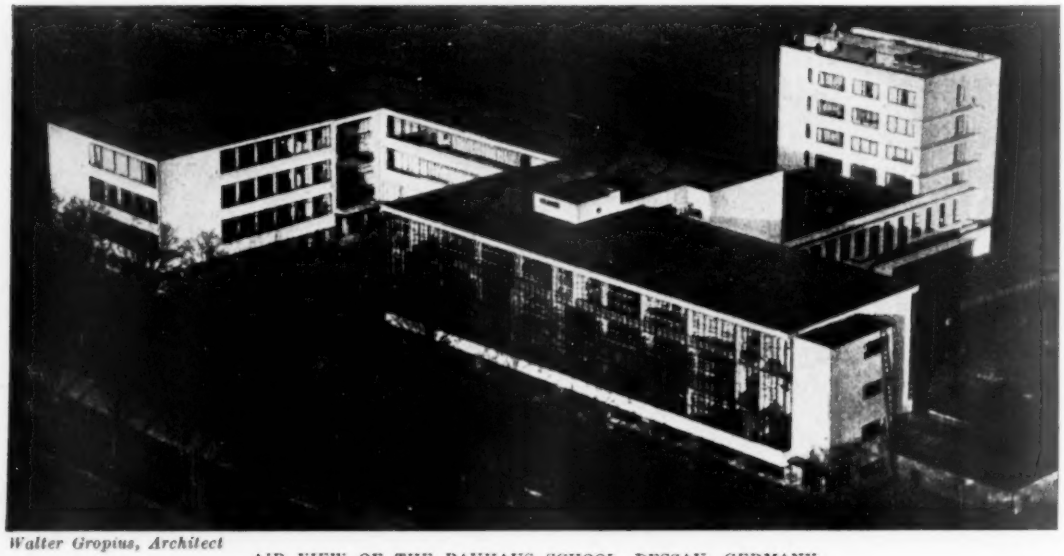
The problems facing a community wishing to build a school are legion. How many and how large schools are needed? What room space and what facilities such as libraries, auditoriums, gymnasiums and cafeterias are needed? These preliminary questions an educational survey must decide.

It is the province of the architect, with his imaginative sense of space, to propose new ways of grouping functions for better school efficiency and less expense. He may show, as in the Friedrich Ebert School in Frankfort, for instance, how outdoor classrooms can be arranged with a minimum of waste space and a maximum of privacy, and how a novel arrangement of auditorium and gymnasium can allow the two rooms to be combined when desired. The plan of the Bauhaus School is a remarkable example of functional planning. The various units of the building—living studios, classrooms and workshops—are all in separate wings, joined together by the auditorium and administration offices, which function demands should be in the center. There are no courts and no main façades, with the result that no room is a "back" room.

In addition to the better arrangement of functions, the modern architect studies cost. "The greatest results for the smallest outlay" is always his first consideration. He studies his site to avoid the useless excavation and the darkened rooms which invariably follow the placing of a traditional building on a sloping site. He chooses the simplest construction system, usually steel, to suit the needs of the building, and refrains from forcing this steel structure to support a seemingly wooden Georgian tower. Lastly, he omits ornament.

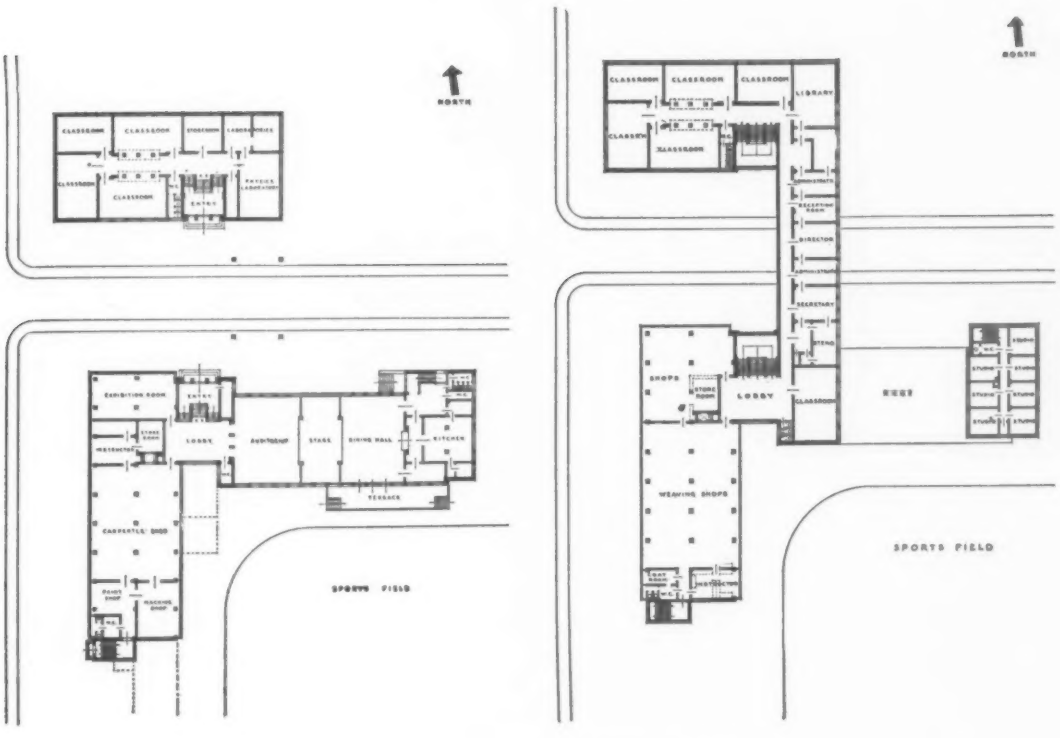
Modern School Buildings Have Beauty

The contribution of real modern architecture to school buildings is not merely better planning and cheaper construction, well-lighted and functionally adjusted rooms. The element of design is still as important as in any style of the past. Only the principles of design are different, just as steel cage construction is different from the masonry of yesterday, just as machine methods are different from handicrafts of previous centuries. Skill in proportioning, careful handling of the decorative elements (window and door frames, foundation and wall capping), and the selection of appropriate and beautiful surface materials are the bases of the esthetic effect of modern buildings, as they are of all great architecture of the past.



Walter Gropius, Architect

AIR VIEW OF THE BAUHAUS SCHOOL, DESSAU, GERMANY



GROUND FLOOR **SECOND FLOOR**

PLAN OF THE BAUHAUS SCHOOL, DESSAU, GERMANY

In contrast to the imitative monumentality of structures built with an eye to the past, modern buildings have a cleanness, lightness and simplicity which accord well with our machine civilization. To surround the growing generation with bad parodies of dead architecture is a foolish anachronism. Photographs of great buildings can better display the glories of the past. Modern architecture gives the contemporary generation a contemporary setting.

Further Comments on Modern Architecture

By ALFRED H. BARR, JR.

Director, The Museum of Modern Art, New York

MY colleague, Philip Johnson, has written for The American School and University an account of modern architecture in relation to educational buildings. I should like to describe one building which seems to be an epitome of the extravagance and foolish traditionalism of many of our American architects when confronted with the problem of building for schools and colleges. One of the best-known of our eastern colleges had long needed a new botanical laboratory. The head of the botany department, approaching the close of a life's work, had been able after a long campaign to secure nearly a million dollars for a new laboratory and equipment. For several years she had studied the problem with members of her department, had worked over the plans with an architect, and then, with the contractor, had studied every corridor, every window, every closet, with the utmost care for the efficient and agreeable execution of the work of her department. She was able with all allowances to save from her fund some $80,000, which she ardently wished to use for the purchase of one of the finest herbariums in any American college.

Most unfortunately, the supervising architect of this college was one of the most noted of American "collegiate Gothic" designers. To his mind every building on this and other college campuses should be a modification of fifteenth and sixteenth century English academic or domestic architecture. The final design of the laboratory, therefore, fell into his hands, with the

following results: The walls which were originally of simple brick were "ornamented" with useless buttresses and expensive stone moldings. Gothic doors and mullioned windows were applied. A huge three-story, pseudo-Gothic porte-cochère was put up to mask a slight bend in the façade (an irregularity of plan made necessary by the terrain, and one which would have been accepted by his medieval predecessors without the concealing appendage).

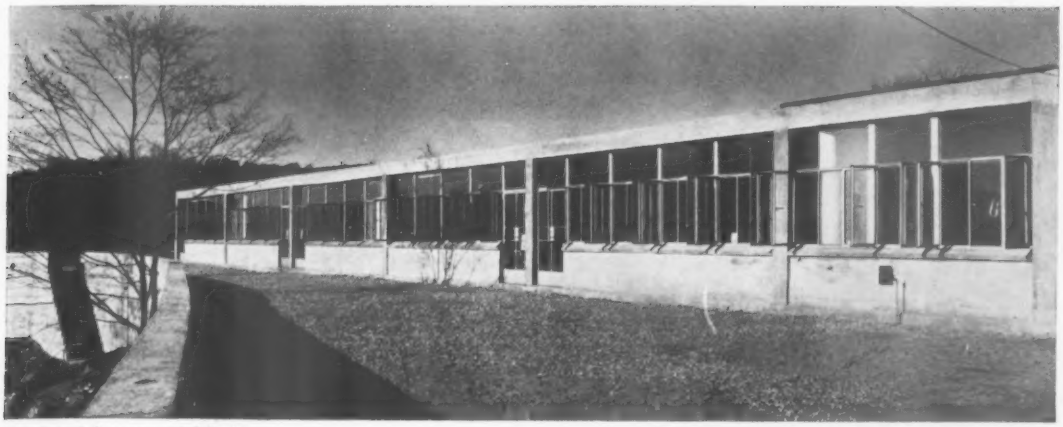
The maximum amount of light for the laboratories required that the windows on the northern façade be carried up to the ceiling of the first and second stories. This made a "Gothic" window difficult. So what did our ingenious pasticheur do but put up a parapet above the second story windows, carrying the jambs of the windows into a pointed arch, which was, however, blind. The third floor on this same façade, containing executive offices, was recessed some ten feet from the façade of the laboratories beneath it. These offices commanded a magnificent view of the country, but, incredible as it may seem to the intelligent layman, the parapet, made necessary by the fake Gothic blind arcade, completely cut off the view and left the professors looking at the back of a loopholed wall through which, presumably, students might defend the building with crossbows. Throughout the rest of the building similar absurdities and inconveniences resulted from this Gothicizing of an originally clean and intelligently planned modern building. These Gothic adornments, stone copings, moldings, mullions, parapets, arches, doorways, loopholes, and so forth, ate up the surplus, so that the herbarium, an essential and valuable part of the department's equipment, had to be sacrificed—to the great bewilderment and distress of the professors.

This building had not even the excuse of being part of a general compound. No other buildings were near it except a Colonial frame house. It is a by no means unusual monument to the folly and senseless waste of our American academic architects. Among the campus buildings of too many of our colleges and preparatory schools one will find similar anachronisms.

Mr. Study in Rebuttal

Criticism of the historic styles has ever been present, and we should not be misled by the mere assertion that the Colonial and Gothic are nothing but dead styles. A great system of design, such as one of the historic styles, is a vital creation, possessing eternal qualities which are perfectly adaptable to the varying conditions of time. Critics of the historical styles seem to have no hesitancy in rushing into fields where the most skilful and experienced architects fear to tread. It seems almost incredible that even critics with ultra-modern leanings could assume, as do the authors of the two preceding articles, that our leading American architects do not fully appreciate the functional properties of their buildings and that they have worked only with the thought of obtaining a Colonial or a Gothic façade, giving little or no thought to the proper arrangement and composition of their school plan.

Faced with the problem (to use the modernists' own words) of "making a school function fully," I should say that first and foremost comes the necessity of building up character in the youth of our land. And from a practical standpoint, to fulfill this "function," an architect must choose one of the period styles for his medium of expression. He need not follow the style with utmost fidelity and he may play with it to suit his fancy. If he plays with it with intelligence and is himself a true artist, the result will probably be highly satisfactory.



Howe and Lescaze, Architects

THE FIRST STORY OF THE HESSIAN HILLS SCHOOL HAS BEEN COMPLETED AND IS IN USE

A School Building That Breaks with Tradition

The Hessian Hills School, Croton-on-Hudson, N. Y.

By ELIZABETH MOOS

Director

MODERN education is reaching out to the home, the community and the world for its growth experiences. It is freeing itself from that part of our heritage which is meaningless in our present civilization. Modern education cannot therefore be satisfactorily fitted into the usual type of school architecture. Its material requirements are different and its spirit far from the traditional. The old type school with its withdrawal from the world of reality could function in the monastic type of architecture so popular with universities. The rudimentary school, interested only in the three R's, got on very nicely in the "little red schoolhouse." But a modern school needs to be housed in a building which not only meets its very exigent physical requirements, but which is direct, sincere and in harmony with its purpose.

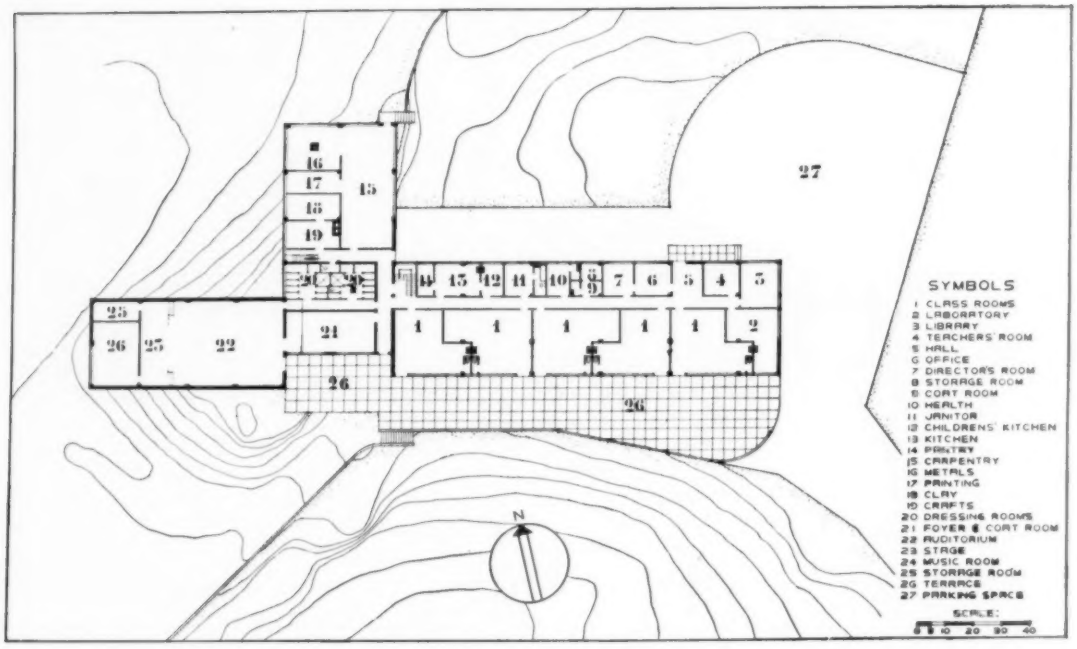
Modern architects as well as modern educators have discarded outworn dogmas. They are no longer facing the past but the future. They create rather than imitate. So when the Hessian Hills School burned and a new building had to be planned, we felt that only by modern architects could our point of view, our needs physical and spiritual, be understood. Our first step was to formulate these needs in our own mind.

The faculty and director worked out a detailed list of desiderata based on our program. Each teacher, in fact, drew up a well-thought-out plan of her ideal classroom. These plans—in particular those made by the teachers in charge of laboratory and shop—have been incorporated in the building.

The desiderata were as follows:

1. Seven classrooms, each to house 15 children

A DRAWING OF THE SCHOOL AS IT WILL LOOK WHEN THE SECOND STORY HAS BEEN ADDED



THE FIRST FLOOR PLAN

with room enough to move about in, i.e., each to be 600 square feet.

2. A lavatory in each classroom, for purposes of cleanliness, painting, filling of aquaria, working in clay, watering plants, etc.

3. A separate toilet for each class, entered from the room. This is an essential. Psychologically-minded teachers realize the value of eliminating rows of girls' toilets and rows of boys' toilets at a distance from the schoolroom.

4. An alcove in each group room, so that a few might work quietly while the rest could move about freely, and, if necessary, noisily.

5. Easy access to the fields and woods we use so much.

6. Sunny south exposure for all group rooms. The walls should be as sound-proof as financially possible, since the younger groups have work-benches in their own rooms.

7. The three group rooms for the youngest children should be near each other and at the end of the building close to their own playground. The older groups must be where they are not disturbed.

8. The quietest possible location for (a) a laboratory for both physical and biological sciences; (b) a library; (c) a studio for painting and sculpture.

9. An isolated health room, with its own toilet.

10. A kitchen equipped to feed 70-100 people.

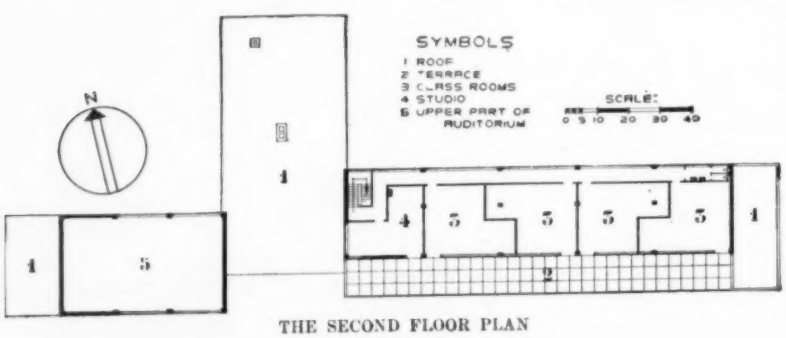
11. A children's kitchen with complete child-size equipment.

12. Shops for every form of hand work, including place for forge, kiln, looms and printing press; provisions for storing children's partly finished work; long walls along which to store lumber; safe places for a lathe and a power saw; and floor space for large projects. The shops must be located where noise would not disturb the rest of the building, but where they are accessible to all but the youngest children.

13. A music room for singing and instrumental work.

14. A large room for rhythms, dramatic and chorus work, this room to have showers and dressing rooms accessible to all groups.

15. Adequate offices and teachers' room.



THE SECOND FLOOR PLAN

16. Storage space for coats, rubbers, baseball bats, school materials, janitor's supplies, tools, etc.

All this, in detail, we told to the architects, Messrs. Howe and Lescaze. They asked us many questions about the actual life in the school and tried to get a clear picture of what would go on in each room of the projected building, before they started their plans. They of course visited the site, which was a difficult one, being very rough and rocky.

An unused road with a slope in front offered a level place to begin with, and was used very cleverly. Blasting had to be avoided as much as possible because of its cost. This was done by eliminating a basement except where the slope of the ground provided one. Our financial limit was $65,000. For this we wanted a fireproof building which would fit into our rocky Westchester hillside, provide all the space we needed and express our ideals. Not an easy task! In addition, we felt that it would probably be impossible to raise sufficient funds to erect the entire structure at once, so the plan had to permit a part to be constructed later.

The lower floor and shop wing of the building are now completed. All classrooms are on the sunny side and face the view. The terrace provides a place for quiet outdoor work, each room opening on it with large double glass doors.

The main building is constructed of poured concrete and steel columns, with steel casement windows. The floors are of cement over hollow tile and cinders. Asphalt composition and asphalt tile are used except in the textile and carpentry shops, where maple is used, and in the forge, clay rooms and laboratory, where the floors are finished cement. The ceilings are concrete slab, poured on the job. The roof is covered with five-ply waterproofing. The partitions are hollow tile, plastered, with grounds for shelving, etc., every three feet. Door frames and doors of metal make the building completely fireproof; their unbroken blue surface contributes just the right amount of color. The shop wing is of gray brick with factory sash and a wooden roof, an economic construction which is not fireproof but which is separated from the main building.

The amount of building we now have has cost $47,000. The work of letting contracts and supervision was carried on by a group of parents experienced in building operations. The estimated cost of the second floor is $6,000, and of the music and rhythms rooms, $12,000.

Our physical requirements are met. The building is beautiful, satisfying, peaceful, harmonious. It has no purposeless decoration, within or without. Its white walls and gray floors make a perfact background for the children and their colorful work. Its beauty is a beauty of proportion and unity.

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

Beds and Bedding—Englander Spring Bed Co.
Boilers—American Radiator Co.
Cleaning Equipment—The Kent Co., Inc.
Flooring—Thomas Moulding Floor Co.
Heating and Ventilating System—Hardinge Bros., Inc.
Laboratory Furniture and Equipment—Central Scientific Co.
Plumbing Fixtures and Sanitary Equipment—Standard Sanitary Mfg. Co.
Windows and Sash—Truscon Steel Co.

Score Card for Junior High School Buildings

By N. L. ENGELHARDT
Professor of Education
Teachers College, Columbia University

SCORE cards for elementary school buildings, high school buildings, and rural school buildings have been developed and used extensively during recent years in the analysis of school plants. A score card for junior high school buildings has been found necessary and has been developed to meet this need. This score card allots 1,000 points as follows: Site, 100 points; Building, 150; Service Systems, 250; Classrooms or Recitation Rooms, 160; Special Classrooms, 130; General Service Rooms, 150; and Administration Rooms, 60. The allotment of points was made by graduate students working under the direction of the authors, who also redistributed the points among the other subdivisions of the card.

The score card and its accompanying standards should be of value to superintendents of schools and architects who are confronted with the problems involved in the development of plans for junior high school buildings. The standards for each of the topics or items on the score card have been written with the utmost of detail and with special regard to the educational demands of the junior high school program.

Special emphasis has been placed upon certain items which have not been given much consideration in rating school buildings in the past. These items include such features as ample parking spaces for automobiles; the acoustics of classrooms, corridors and special rooms; provisions for radio and audio-visual education; kinds of lockers and types of locking devices; movable and built-in equipment in classrooms; the inclusion of an audio-visual studio; and emphasis upon specialized equipment for special laboratories and classrooms.

SCORE CARD

FOR

Junior High School Buildings

By

GEORGE D. STRAYER

AND

N. L. ENGELHARDT

TEACHERS COLLEGE, COLUMBIA UNIVERSITY

PUBLISHED BY

BUREAU OF PUBLICATIONS, TEACHERS COLLEGE

COLUMBIA UNIVERSITY

Name of School_____

City_____ State_____

Date_____ Scorer_____

Instructions for Using Card. (1) Items for scoring, 1,000 points. (2) For scoring, three columns are allowed. While actually at work on a building, one need fill out only the first column, the second and third to be filled out at leisure. (3) Where credit is allowed for any single item not present and not needed in a building, a circle should be drawn round such credit. All scores should be recorded on the basis of the standards outlined in the bulletin "Standards for Junior High School Buildings" by N. L. Engelhardt (published by Bureau of Publications, Teachers College, Columbia University, New York City). In the survey of a school building, the Engelhardt "Field Survey Book for Junior High School Buildings" will be found useful in gathering data.

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Strayer-Engelhardt Score Card for Junior High School Buildings

	1	2	3
I. Site			100
A. Location		40	
1. Accessibility	15		
2. Remoteness	10		
3. Environment	15		
B. Topography		30	
1. Elevation	5		
2. Soil and Subsoil	5		
3. Natural Features	5		
4. Landscaping and Upkeep	5		
C. Provisions for Use		60	
1. Size and Form	20		
2. Roads and Parking Spaces	5		
3. Play Fields	10		
4. Auxiliary Provisions	5		
II. Building			150
A. Placement		20	
1. Position on Site	10		
2. Orientation	10		
B. Gross Structure		60	
1. Type of Architecture	5		
2. Plan Type	10		
3. Construction Type	10		
4. Height	2		
5. Roof	3		
6. Foundations	10		
7. Walls	10		
8. Entrances	3		
9. Penetration	5		
10. Utilization	10		
11. Aesthetic Balance	5		
12. Acoustics	2		
13. Condition	5		
C. Internal Structure		60	
1. Corridors	20		
2. Stairways	15		
3. Color Scheme	5		
4. Basement	5		
5. Attic	5		

	1	2	3
III. Service Systems			250
A. Heating and Ventilating		80	
1. Kind	15		
2. Installation	10		
3. Air Supply	5		
4. Fans and Motors	5		
5. Distribution	5		
6. Temperature Control	5		
7. Special Provisions	5		
B. Fire Protection System		60	
1. Fireproofness	20		
2. Exits and Escapes	10		
3. Apparatus	3		
4. Electric Wiring	2		
5. Fire Doors and Partitions	3		
6. Exit Lights and Signs	2		
C. Cleaning System		15	
1. Kind	5		
2. Installation	5		
3. Efficiency	5		
D. Artificial Lighting System		25	
1. Provision for Electricity	5		
2. Light Sources and Intensities	6		
3. Switches and Switchboards	4		
4. Outlets and Adjustments	4		
5. Method of Illumination	4		
6. Maintenance and Inspection	4		
E. Electric Service System		10	
1. Clocks	2		
2. Telephones	2		
3. Fire Alarm System	2		
4. Call System	2		
5. Departmental Electric Power Supply	2		
F. Electrical Teaching Aids		10	
1. Audio-Visual Provisions	5		
2. Radio Provisions	5		
G. Water Supply System		20	
1. Drinking Fountains	5		
2. Lavatories	5		
3. Sinks	5		
4. Showers	5		

The score card and standards have been in preparation over a period of years. The building plans of outstanding junior high schools in various parts of the United States have been analyzed thoroughly to discover the provisions which are made in superior schools devoted to junior high school work. Bulletins issued by State Departments of Education, which concerned themselves with the educational or building character of the junior high school, were also used in the determination of the items to be included. The score card and standards were originally issued in mimeographed form and thus used for critical review and study by competent graduate workers in the field of educational administration.

This score card was first used in the scoring of junior high school buildings in connection with the survey of the school system of Chicago, Ill., recently made by the Division of Field Studies of Teachers College, Columbia University.

	1	2	3
H. Toilet System		35	
1. Distribution and Arrangement	7		
2. Fixtures	7		
3. Adequacy	7		
4. Seclusion	5		
5. Sanitation	7		
6. Supplies	2		
I. Mechanical Service System	5	5	
J. Locker Service		20	
1. Home Lockers	5		
2. Gymnasium Lockers	5		
3. Lockers for Shops and Laboratories	5		
4. Special Locker Provisions	5		
K. Laundry Service	5	5	
L. Storage Service		15	
1. Custodial Storerooms	2		
2. School Supply Storage	2		
3. Book Storage	1		
4. Bicycle Storage	1		
5. Parking Space	2		
6. Receiving and Shipping Office	2		
7. Fuel Storage	2		
8. Gymnasium Storage	1		
9. Custodian's Workshop	2		
IV. Classrooms or Recitation Rooms			160
A. Location and Connection	20	20	
B. Construction and Finish		70	
1. Size and Utilization	25		
2. Floors	00		
3. Walls and Ceilings	10		
4. Doors	4		
5. Built-in Equipment	10		
6. Chalk Boards	3		
7. Bulletin Boards	3		
8. Color Scheme	5		
C. Illumination		40	
1. Glass Area	15		
2. Windows	15		
3. Shades and Curtains	10		
D. Movable Equipment		30	
1. Seats and Desks	15		
2. Teachers' Desks	5		
3. Other Equipment	10		

	1	2	3
V. Special Classrooms			130
A. Science Laboratories		20	
1. General Science Laboratory	10		
2. Biology Laboratory	5		
3. Lecture and Dark Rooms	5		
B. Household Arts Department		30	
1. Foods and Cookery Laboratory	10		
2. Clothing Laboratory	10		
3. Housekeeping Apartment Laboratory	10		
C. Industrial Arts Shops		40	
1. Woodworking Shops	10		
2. Machine and Metal Shops	10		
3. Print Shop	5		
4. General Laboratory of Industries	5		
5. Auto Repair Shop	5		
6. Electrical Shop	5		
D. Commercial Classrooms		15	
1. Typewriting Room	5		
2. Business Training Room	5		
3. Commercial Laboratory	5		
E. Drawing and Art Classrooms		15	
1. Art	5		
2. Mechanical Drawing	3		
3. Arts and Crafts	3		
4. Other Art Rooms	2		
F. Music Rooms		10	
1. Chorus Room	4		
2. Instrumental Room	4		
3. Practice Rooms	2		
VI. General Service Rooms			150
A. Auditorium		45	
1. Assembly Room	20		
2. Stage	5		
3. Stage Dressing Rooms	4		
4. Scenery Preparation Room	4		
5. Property Room	4		
6. Audio-Visual Equipment	4		
7. Other Auxiliaries	4		
B. Audio-Visual Studio	10	10	
C. Library		20	
1. Library Reading Room	15		
2. Librarian's Workroom	1		

	1	2	3
3. Conference Room	3		
4. Library Stack Room and Film Library	1		
D. Study Hall	10	10	
E. Gymnasium Facilities		10	
1. Gymnasium Rooms	20		
2. Spectators' Gallery	2		
3. Departmental Offices	1		
4. Special Auxiliary Rooms	2		
5. Dressing Facilities	10		
F. Swimming Pool	10	10	
G. Cafeteria		20	
1. Lunch Room	10		
2. Faculty Lunch Room	1		
3. Kitchen	5		
4. Dish-Washing Pantry	2		
5. Auxiliary Rooms	2		
VII. Administration Rooms			60
A. Administration Offices		20	
1. Principal's Private Office	3		
2. Assistant Principal's Office	3		
3. General Office Workroom	5		
4. Reception and Waiting Room	2		
5. Auxiliary Rooms	4		
6. Other Administrative Offices	3		
B. Teachers' Rooms		10	
1. Women's Rest Room	2		
2. Men's Retiring Room	2		
3. Teacher Preparation Rooms	3		
4. Teacher-Student Conference Room	3		
C. Health Service Rooms		15	
1. Medical Clinic	3		
2. Nurse's Room	3		
3. Waiting Room	3		
4. Dental Clinic	3		
5. Other Health Service Rooms	4		
D. Student Activity Room	5	5	
E. Custodial Service Rooms		10	
1. Custodian's Office	3		
2. Engineer's Room	3		
3. Male Janitors	2		
4. Female Help	2		
Totals	1000	1000	1000

Modern Practice in School Lighting

By ROBERT L. ZAHOUR

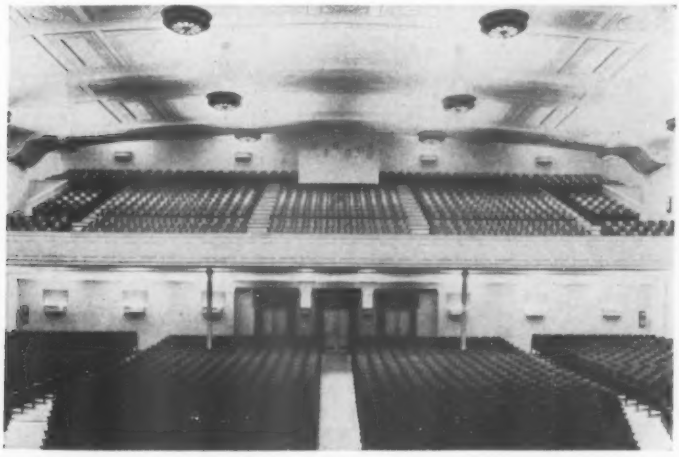
Commercial Engineering Department, Westinghouse Lamp Company

ALL lighting installations are designed and executed with a view to satisfying one thing —the eye. To enable human beings to see with precision, speed and comfort is the ultimate aim of artificial illumination, whether it be in the home, the office, the factory or the school.

One must remember that the eyes of young people are in a state of development all during their school days, and even during their college days as well. To deprive school children of high-intensity artificial illumination, which at its best is only a glimmer compared to the light to which nature has accustomed us, may injure their eyesight enough to retard their progress in school. Then in all probability they will suffer from defective vision before reaching adult age. Poor eyesight is one of the worst handicaps that can fall to the lot of any human being.

Not only are the eyes of school children immature, but their ability to realize when room lighting is insufficient is undeveloped. They may strain their eyes for years and not know it. Therefore it is the duty of school authorities to give them the type of illumination which standard practice has demonstrated to be ample for their needs. Through intensive study and experiment, a minimum for correct lighting for schoolrooms has been determined. The Illuminating Engineering Society and the Eye-Conservation Council, working in collaboration with the American Institute of Architects, are keeping abreast of changing conditions in classroom design and in the correct type of lighting to accompany it. "Standards of School Lighting," a group of requirements serving as a guide, was recently brought up to date (September, 1931), and it is upon these findings that the following recommendations are based.[1]

AN EYE-CONSERVATION CLASSROOM IN A JERSEY CITY SCHOOL
Special blackboard units are used, in addition to semi-indirect enclosing globes with 500-watt Mazda lamps



THE AUDITORIUM OF THE NEW ALAMEDA HIGH SCHOOL, ALAMEDA, CALIF.
Special luminous-dome indirect-type ornamental fixtures are equipped with 500-watt Mazda lamps. Urns attached to the wall on the main floor and above the balcony supply supplementary indirect illumination

Classrooms and Study Halls

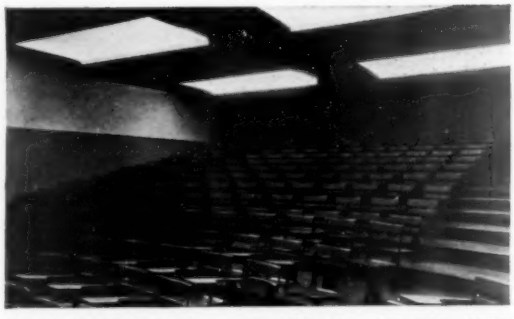
For comfortable vision free from squinting and its resultant eye-strain, the lighting intensity in classrooms should never fall below ten foot-candles.[2] Enclosing globe fixtures, preferably of the semi-indirect type and equipped with 200-watt Mazda lamps, will produce this intensity. They should be suspended 9 feet 6 inches above the floor in rooms with a ceiling height of 12 feet, and should be spaced on 10- to 12-foot centers. As the height of the ceiling increases above 12 feet, the lighting units can be mounted proportionately higher.

[1] Copies of the pamphlet may be obtained from the American Standards Association, 29 West 39th Street, New York.

[2] A foot-candle is the intensity of the light of a standard candle at a distance of one foot.

Enclosing globes of diffusing or refracting glass have a low surface brightness, a factor which reduces glare. In addition to diffusing the light, this type of unit with its opaque glass gives a better distribution of light. With good light distribution, light and dark areas throughout the room are eliminated to such a degree that children's eyes are saved the tiresome task of viewing objects under varying intensities.

Restrictions on the mounting height of the units also guard against another kind of glare —that from blackboards. If the lighting units are suspended farther than 2 feet 6 inches below the ceiling, the light sources are in a position to produce objectionable blackboard glare, which is really the reflection of light from the surface of the board. Such a condition tends to hide blackboard figures and makes it difficult to see and understand what the teacher is talking about.



COVE LIGHTING IN A CLASSROOM OF THE NEW SCHOOL FOR SOCIAL RESEARCH, NEW YORK CITY
A row of lamps are placed along the back edge of each niche

LUMINOUS-DOME INDIRECT LIGHTING IN THE LIBRARY OF THE NEW JOYCE SCHOOL, DETROIT

Daylight Glare

Blackboard glare is a problem resulting not only from artificial lighting but also from daylight. In either instance it may be corrected by the use of a matt-finish board which diffuses the reflected light, or by special lighting units mounted on the ceiling above the blackboard. In one installation of blackboard lighting, eight special blackboard units, each equipped with two 150-watt PS25 Mazda lamps, are mounted close against the ceiling and spaced on 6½-foot centers. Refracting lenses in each of these units concentrate the light on the blackboard surface. This form of illumination practically eliminates blackboard reflections, whether from artificial lighting units or from daylight through the windows.

Variations in the color of the wall surrounding a blackboard sometimes produce an extreme contrast that causes eye fatigue. To prevent the occurrence of such a condition, it is recommended that the lower section of the walls, particularly that below the blackboard or up to a height of 3 feet above the floor, be finished in a medium shade having a reflection factor of not more than 50 per cent. The upper section of the walls and the ceiling should be colored a light cream or white, with a diffused reflection value of 75 to 85 per cent. High reflection on these surfaces adds to the intensity of light in the room, for part of the light from the ceiling units reaches these surfaces and is reflected back into the room as high-quality illumination. Dull finishes are recommended in preference to glossy so as to reduce the reflection of glare.

Lighting for Special Rooms

General science rooms, sewing rooms, and chemistry laboratories

STACK LIGHTING IN THE UNIVERSITY OF WISCONSIN LIBRARY
Individual reflectors equipped with 60-watt Mazda lamps are mounted on 3-foot centers

should be lighted to an intensity of 15 foot-candles, using units which still embody the standards of proper distribution and well-diffused illumination. Much of the accuracy required in the work in these special rooms depends upon the eye judgment of the students, and unless there is even illumination of high intensity, their eyes will falter.

To provide light of the proper intensity, the rooms should be equipped with enclosing globe fixtures burning 300-watt Mazda lamps. They should be suspended at heights of 10 to 12 feet and spaced on 10- to 12-foot centers. Chromium-plated or non-corrosion hangers should be used in chemistry and domestic science laboratories, because they will not become tarnished by fumes rising from experiments. If the upper areas of the walls and the ceilings are finished in dull paints of light colors, the increased reflection of light will aid the general illumination in the rooms, improving the distribution of light.

Drafting Rooms

Drafting rooms used at night as well as by day should be lighted to an intensity of 20 foot-candles. Total indirect lighting is preferable because of its higher quality and because it eliminates glare, which has a tendency to become more pronounced with the use of high-wattage lamps. The units should be suspended 2 to 3 feet from the ceiling, spaced on 10- to 12-foot centers, and should be equipped with 500-watt Mazda lamps.

Highly diffused illumination permits students to see the fine lines of their drawing without the necessity of squinting. It is very important that there be no local lighting for individual desks, since such lighting causes glare and makes a harmful contrast with the general illumination in the room, particularly when a student looks up from his board to rest his eyes. Light sources which come within his line of vision produce a sudden change of intensity. This makes him see spots and hinders the accuracy of his vision when he returns to work.

Libraries

The style of architecture in a school library will govern to a certain extent the type of light fixtures to be used. If the ceilings are high and the room is executed in elaborate fashion, the units may be specially designed and, if they produce direct illumination, perhaps suspended on long hangers. For semi-indirect or totally indirect lighting, the units must be hung comparatively close to the ceiling, say 5 to 10 feet, to provide efficient reflection from that surface, a secondary source of light. Otherwise the lighting installation should follow the recommendations for classrooms, using the factors of good distribution, absence of glare, and suitable intensity as a basis for design.

There are two main divisions of lighting peculiar to all libraries—that for general reading rooms and that for stack rooms. General reading rooms should have high-intensity lighting of good quality, with an absence of glare and a minimum of shadows. In high-ceiling rooms, local lighting, consisting of special units built into or mounted close to the reading tables, is sometimes installed. No particular class of lighting is recommended, but totally indirect is undoubtedly the most desirable because of its high-quality characteristics. Cove lighting is employed in some modern installations to produce totally indirect illumination.

Lighting for stack rooms has primarily a utility purpose, namely to facilitate the finding of books. Here, 60-watt Mazda lamps, in luminaires specially designed for the purpose, should be installed on 8-foot spacings. Generally a row of small reflectors, supported by a length of conduit pipe mounted on the ceiling, provides satisfactory illumination. Some stack rooms use totally indirect illumination, but in such instances there must be a ceiling clearance above the book stacks.

Auditoriums

Auditoriums, of all places in the school building, readily adapt themselves to artistic decorations. Conforming to this practice, the lighting units can be of elaborate design. Although probably used most frequently for assemblies, an auditorium should be equipped with a flexible lighting installation that will give a theatrical atmosphere for school plays; that is, the auditorium lighting should be so wired that it can be dimmed.

Some manner of stage lighting should also be included in the auditorium installation. There should be a row of footlights, several spotlights for the wings, and if there is a projection booth, ample equipment in it. The average school cannot expect to duplicate the stage lighting equipment of a real theater, but it can at least create a little professional atmosphere in its productions.

A Long Way to Go

A little over fifty years ago artificial illumination by means of incandescent lamps was in its infancy. Today, despite all the improvements that have resulted during the intervening years, it is still in its childhood. The progress of scientific study during the same years has shown us that the human eye, in order to function at its best, requires many times the brightness considered good practice today. The job of educating the public to the proper use of high-intensity illumination is perforce a slow one. Many people are reluctant to install even the prescribed intensities in our schools today, yet these intensities in years to come will seem ridiculously low. Within a decade we shall probably be using twice as much light as we do today, and our eyes will benefit by it.

Building Fire-Safe Schools

By ROBERT S. MOULTON

Technical Secretary, National Fire Protection Association

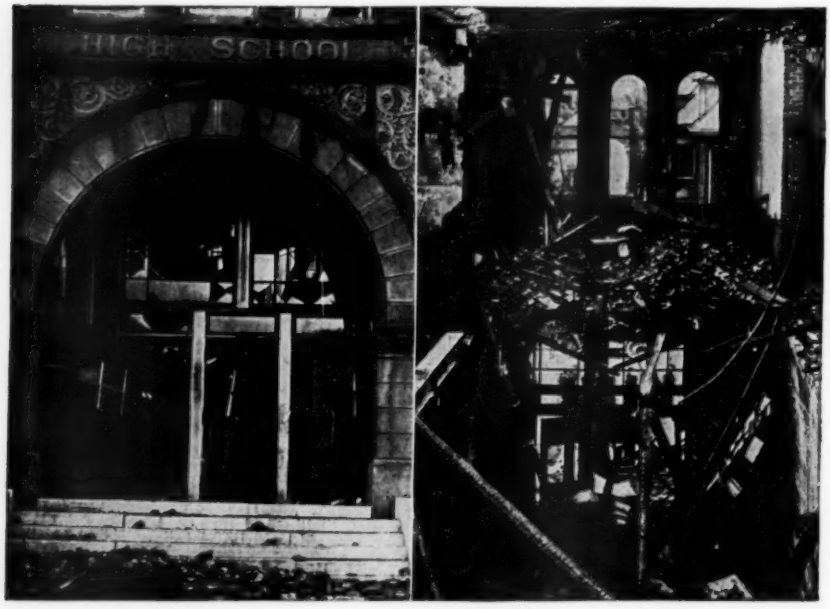
CHILDREN are required by law to attend school, and by reason of this compulsory attendance there is a community responsibility for the safety of the pupils of a very different kind from that involved in mercantile or industrial buildings largely frequented by adults whose presence is voluntary. In addition to the life hazard involved, the burning of a school destroys the facilities for instruction and is likely to interfere seriously with the normal development of the pupils affected and may delay by a year their completion of their usual schooling, with resultant loss of a year as participants in the constructive activities of the community. These considerations, in addition to the dollars and cents value of the physical property which may be destroyed by fire, call for a degree of attention to the fire problem of schools far beyond that required for mercantile, industrial or ordinary residential properties.

The National Fire Protection Association recently made an analysis of 875 typical school fires. In 43 of these fires there was loss of life, a total of 471 fatalities. The probability of fire in any individual school may be remote, but the fact that the mathematical probability of fire is small is of no comfort to the parents of the children who are cremated in a school fire when it does occur, nor is this any reason for failing to take precautions and to observe the well-recognized fire prevention measures.

Interior Defects Prevalent

After a fire, it is usually a simple matter for the fire chief to point out where and how the fire occurred and the factors that were responsible for its spread. It takes no special technical knowledge for a member of the school committee to see, when the fire chief points it out, that fire originating in waste paper in the basement passed up through a hollow wooden partition and broke out simultaneously in a number of places on the upper floors almost before it was discovered. Bricks judiciously placed, or other suitable noncombustible material inserted at the bottom of the hollow partition, would have closed off that potential flue, giving no avenue for the spread of fire, and would have made it possible to extinguish the fire at its point of origin, with relatively little damage. After a fire all this is clear.

Why should not such points be equally obvious when the building is being planned and while it is under construction? The fire protection specialist sees these and if his advice is asked can make suggestions for vastly increasing the fire safety of the structure. The architect and the builder will know about these things and can incorporate these features of built-in fire safety. It should be noted, however, that the architect and the builder are both essentially employees hired for the job of designing and erecting the



THE FIRE WHICH DESTROYED THE RICHMOND, IND., HIGH SCHOOL STARTED IN THE BASEMENT AND SPREAD RAPIDLY TO THE UPPER PARTS OF THE BUILDING THROUGH VENTILATING DUCTS

DAWES HOUSE, A DORMITORY AT LAWRENCEVILLE SCHOOL, LAWRENCEVILLE, N. J., WAS OF FRAME CONSTRUCTION AND BURNED LIKE TINDER

The boys sleeping in the building escaped clad only in night clothes

school building and that they must take their orders from the school board or school committee. Unless the school committee shows an intelligent interest in fire safety, it is not surprising if the building when completed has a monumental exterior appearance but is riddled with interior defects which would almost seem deliberately designed to facilitate the rapid spread of fire through the building.

"Fireproofing"

Few people realize the slight difference in the cost between fire-safe schools and the veritable fire-traps. It may often happen through poor design that the fire-trap building costs more than one which is relatively safe from fire. There is a good deal of misinformation prevalent about the so-called "fireproof" building. Actually there is no such thing as a fireproof building, for there is no known material which is not affected to a greater or less degree by a fire of sufficient intensity and duration. The National Fire Protection Association has accordingly discontinued the general use of the term "fireproof" in any of its publications, and substitutes the term "fire-resistive," which is more truly descriptive of actual conditions. Even granting the use of the best fire-resistive material, we must always remember that the contents of the building may furnish fuel for the fire and that with improper interior design the "100 per cent fireproof" building may be far from safe.

Not long ago I inspected a three-story school building which to all external appearances was of first-class construction: brick walls, concrete floors and thoroughly "fireproof" in the popular sense of the term. In the basement, however, was a large manual training room full of wood shavings and various types of woodworking machinery. Ample fuel was present for a severe fire in this room and potential fire causes were obvious. The adjoining boiler room might have furnished a spark to ignite the shavings, a glue pot might have ignited the wooden table on which it rested, or some of the electric motor-driven machinery might have caused the fire. Once a fire started in this veritable tinder box it had a natural and unobstructed flue, consisting of the so-called "fireproof" stairway, to lead the smoke and flames to all parts of the building. The only separation between the manual training room and the stairway was a wooden door with glass panels which would have broken out with the first puff of smoke. There were doors at the foot of the stairway, to be sure, but these were fastened open with neatly cut wooden wedges. Serious fire and loss of life are entirely possible in a building of this type, even when of the best type of fire-resistive construction. A little intelligent thought in the design of such a building, however, would have placed the manual training room and other hazardous occupancies in an isolated part of the building, would have cut off this room from other portions of the building by appropriate fire doors or would have provided automatic sprinkler protection. Items such as this may be of even greater importance, in the usual type of school building, than the character of construction of the building itself.

Those who have not had personal experience with fire often fail to realize the extreme rapidity with which fires may spread and do not appreciate the fact that smoke coming up a stairway from a fire starting on a lower floor may make that stairway impassable and induce a fatal panic. Fire-resistive (so-called fireproof) building construction is of very great value, but the responsibility for the fire safety of schools by no means ends with the use of fire-resistive materials in building construction, for even a small fire in the combustible contents may produce a fatal quantity of smoke.

WHEN FIRE BROKE OUT IN THE HARRAH, OKLA., HIGH SCHOOL, THE BUILDING WAS VACATED IN LESS THAN THREE MINUTES

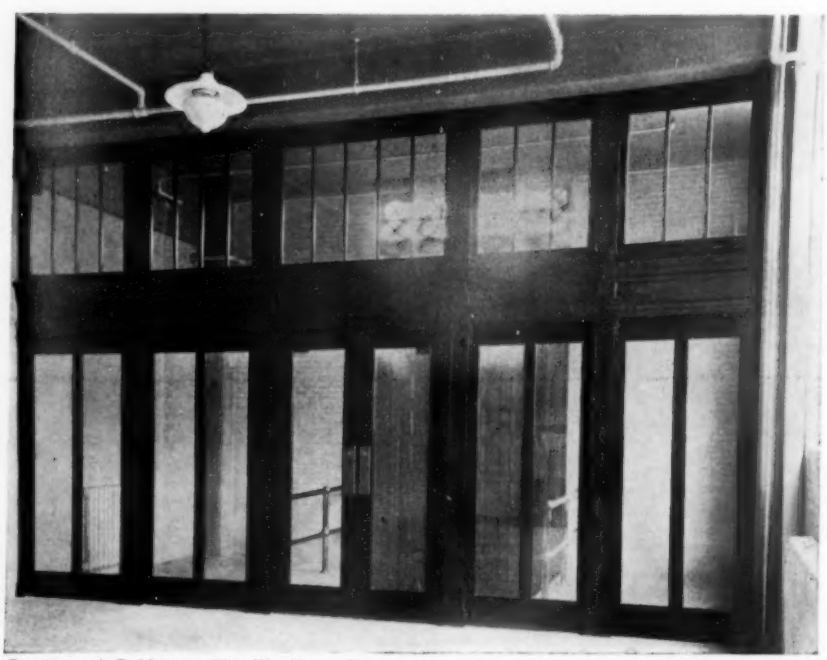
The children on the first floor made their exit by way of the three outside doors, while those on the second floor for the most part used the slide fire escape

The Enclosure of Stairways

One of the most essential features of school fire safety, and one which has all too frequently been neglected, is the enclosure of stairways with fire-resistive partitions to cut off the spread of fire and smoke and render the stairways safe means of escape. The main reliance should be placed upon properly arranged interior stairways. Fire escapes can sometimes be constructed on the exterior of buildings to furnish additional means of egress, but fire escapes should at best be regarded as an expedient and any new school buildings should be so designed with adequate interior stairways that fire escapes are unnecessary. Two alternate means of egress should always be provided from every part of the building so that in case fire or smoke makes one exit unavailable the other may be used. This means not merely two separate stairways, for two stairways discharging into a common hallway might both be blocked by a fire in that hallway. It means the arrangement of the stairs with fire-resistive partitions or by other means so that no single fire can in its early stages block both means of egress.

AN INTERIOR-DOOR SMOKE SCREEN IN THE RHODE ISLAND SCHOOL OF DESIGN, PROVIDENCE, R. I. NOTE ALSO THE SPRINKLER PIPES AT THE CEILING

A high degree of fire safety is provided by such safeguards as are illustrated here: fire-resistive construction; an automatic sprinkler system; and smoke-stop partitions constructed of metal and wired glass



Courtesy of Dahlstrom Metallic Door Co.

THE INTERIOR OF THIS MODERN BRICK BUILDING, A HIGH SCHOOL IN GARFIELD, N. J., WAS LARGELY OF COMBUSTIBLE CONSTRUCTION

A fire in the chemical laboratory caused damage estimated at $80,000

Large Areas Should Be Subdivided

Next to complete fire-resistive construction and proper enclosure of stairways, the primary consideration should be the limitation of areas subject to a single fire. From the standpoint of fire and life hazard, one-story buildings of small area are the best, though loss of life by fire has occurred in a one-room school where there was only one door and the windows were barred. It is not generally practicable to build schools in small units, but by proper construction the larger building may be subdivided into a number of relatively small areas, so arranged that a fire in any one area would not affect other portions. This means strategically placed fire walls, or smokestops, with fire doors, or smokeproof doors protecting all openings. Fire spreads vertically more readily than horizontally, and the protection of vertical openings is of primary importance. With all stairways or vertical shafts cut off with fire-resistive enclosures, fire starting on a lower floor will not rapidly spread upward to involve the entire building.

Even more important than the visible openings are the unseen flues of hollow wooden partitions, which should be closed off by suitable "firestopping," or, better still, non-combustible construction should be employed. Ventilating systems may likewise be the means of spreading fire or smoke throughout a building where otherwise the fire might be confined to its point of origin. There are many other features of fire hazard and fire protection that cannot be detailed in this article, and which can be adequately covered only by consistent attention to fire safety throughout the planning of a building and its equipment.

Protecting Existing Buildings

There is fortunately a form of protection available which can be installed in existing school buildings of inferior construction which will largely eliminate the fire hazard. This is the automatic sprinkler system, which experience has shown to be remarkably efficient, no loss of life ever having occurred in a school building equipped with automatic sprinklers. Sprinkler protection should be installed throughout all buildings of combustible construction and is likewise recommended for shops, laboratories and other hazardous areas in newer fire-resistive buildings. Fires originating in the basement are the most serious from the life-hazard viewpoint, and on this account it is particularly important to have sprinkler installations in the basement.

Effective fire drills are absolutely essential to insure the safe evacuation of school buildings in case of fire or other emergency, and a suitable fire-alarm system is likewise essential to insure giving immediate and unmistakable warning of fire to all occupants in the building and to summon assistance. To be effective, fire drills must not be perfunctory, but must be carefully organized and made flexible to meet any emergency. Emphasis should be placed upon discipline and control rather than upon mere speed.

The same features that make for life safety in school buildings likewise reduce the danger of destruction of physical property. The advantages of having fire-safe schools are obvious from every point of view, and no shortsighted considerations of economy should be permitted to jeopardize the lives of the children, endanger the continuity of their education, or expose the city to the possible loss of valuable property.

EDITORIAL NOTE.—Copies of the Building Exits Code prepared by the Committee on Safety to Life of the National Fire Protection Association, may be obtained from the Association, 60 Batterymarch Street, Boston, Mass., for $1.00 each. The Code is the nationally recognized standard for school fire-safety. The Association also publishes a booklet on "School Fires," a record of 875 fires in school buildings (25 cents).

An Elementary School for the Community

The Joseph Koenig School, Two Rivers, Wis.

I. The Functional Planning of the School

By FRED G. BISHOP

Superintendent of Schools

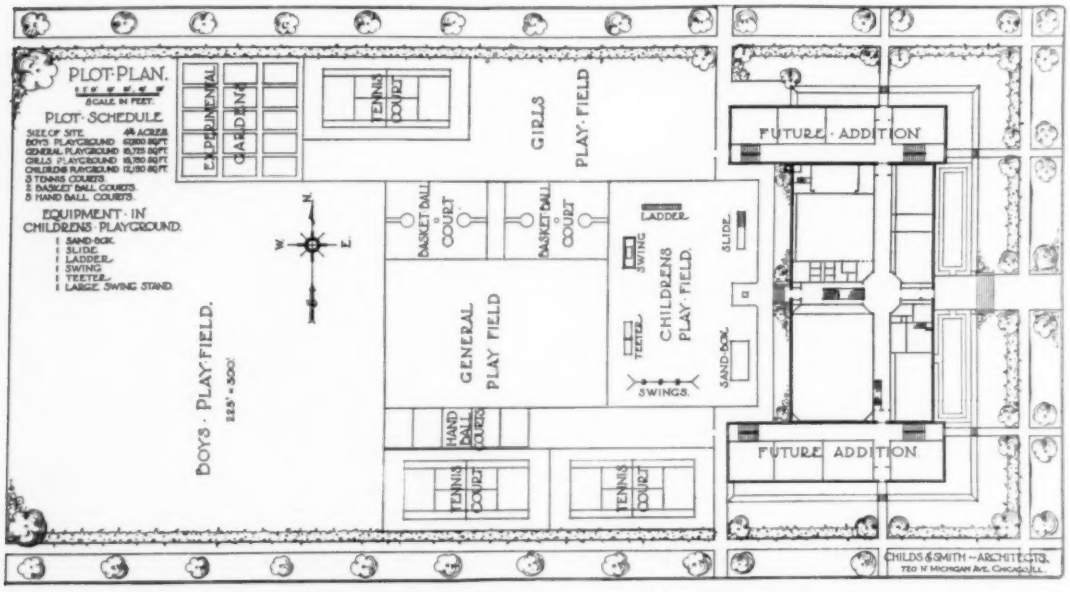
THE Joseph Koenig Elementary School is an embodiment of modern architectural practice designed and planned to meet the needs of an ever-changing modern school system. It combines simplicity of design with economy and efficiency of arrangement, and represents a cooperative effort on the part of the architect and the educational forces in the local school system.

The building was planned to serve both school and community needs. Since the city is committed to a program of progressive school procedure and to a complete utilization of the school plant for recreational and community needs, those in charge endeavored to provide a plant every part of which could function for this dual purpose. No attempt was made to build a modern school plant with a recreational appendage. As a result of the careful planning, the building in operation actually functions in terms of cooperative utilization without any conflict of the two administrative units.

During the past decade school superintendents and architects have been forced to focus their attention on building programs for secondary schools. Much time, thought, and money have been spent on this section of the public school system. Beautiful high school plants have been constructed in practically every city in the country. The same cannot be said of elementary schools. Elementary schools during the past decade have for the most part been planned rather to house children than to serve a definite, well-conceived school program. The Joseph Koenig School stands out as an exceptional example.

We are living in a changing civilization, which means that we are also living in an era of changing school procedure. This means that any school plant planned to serve a single present-day program might easily become obsolete within a decade. A real modern plant must therefore be elastic to the extent that it will serve any possible program now well formulated, and equally well any possible future program within the range of present-day educational thinking. A study of the plant arrangement and facilities provided in the Joseph Koenig School indicates clearly that they will serve equally well the home-room plan, the departmental plan, or the platoon system. From the standpoint of flexibility, the building has few equals in adaptability to meet the requirements of an evolving educational program.

Two Rivers, a city of 10,000, has one of the best organized recreation programs in the Middle West. The recreation department is organized under the city government and is controlled by a



THE PLOT PLAN OF THE JOSEPH KOENIG SCHOOL, TWO RIVERS, WIS.

THE JOSEPH KOENIG ELEMENTARY SCHOOL

separate recreation board, one member of which, by city ordinance, is the superintendent of schools. Although the city schools have no jurisdiction over the recreation department, nevertheless the school buildings furnish most of the facilities through which the department functions. The Koenig School was planned to meet the needs of a segregated section of our population of about 2,500 people. During the past winter the building accommodated approximately 200 adults and 100 younger people five nights a week. This attendance is evidence of the fact that the building was well planned to serve as a desirable recreational center.

II. Architectural Features of the Koenig School

BY FRANK A. CHILDS

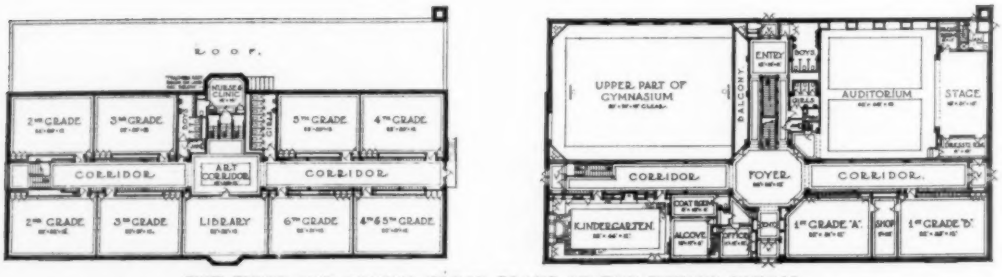
CHILDS & SMITH, ARCHITECTS, CHICAGO, ILL.

THE accessibility and the grouping of the activity rooms in the Joseph Koenig School, which include a gymnasium 50 x 70 x 19 feet, an auditorium seating 350, and accessory rooms, give the building something of a club atmosphere. The main foyer is octagonal in shape, with an electric floor receptacle for a Christmas tree at the center. It can be closed off entirely from the school rooms on the first and second floors, and for evening celebrations can be given a festive appearance with rugs and settees. Should cloakrooms be needed for the auditorium, one of the side corridors adjoining the stairs can be utilized for this purpose. The group also includes the toilets.

The building, of red brick, with a conservative use of stone trimming, has been designed on as small a scale as possible. A play terrace off the kindergarten and first grade room adds to the attractiveness of the main entrance front. The roof decks in general are flat, relieved by a small gable treatment over the main and rear center entrances.

On the main floor are the principal's office, waiting room and toilet; the kindergarten; two first-grade rooms, with a common shop between; the auditorium, with stage and two dressing rooms; and the upper part of the gymnasium, the floor of which is some 8 feet below the level of the main floor. The kindergarten is very commodious, 22 x 44 feet, exclusive of the English

THE KINDERGARTEN ROOM



THE FIRST AND SECOND FLOOR PLANS OF THE KOENIG SCHOOL

The front half of the basement floor is unexcavated. The rear half contains the gymnasium, locker and shower rooms, storage space, and, under the auditorium, the activity room and kitchen, the boiler room, and the ash and coal rooms.

half-timbered house at one end. The house provides a shop, coat-room, and toilet on the main floor, and a mezzanine 19 x 22 feet for miscellaneous projects, a doll house, and other activities. At the opposite end of the room is a fish pool with steps and a bridge above, over which the children love to run and gaze into the water below. The corridor wall houses most of the storage cabinets and a wood-burning fireplace.

The main kindergarten room is treated as a garden, with a green linoleum floor for a lawn and imitation flagstone for walks. The arched wood trellis above may be filled with seasonal foliage during the spring and fall to provide a veritable garden effect. Large window units to the south and east admit abundant sunshine, and a French door gives directly to a play terrace used exclusively for this room.

The rooms for first grades A and B are, respectively, 22 x 31 and 22 x 33 feet in size, with a shop 9 x 22 between them. The rooms are equipped with storage cases and individual work compartments, 10 x 10 x 16, the same as the kindergarten.

The auditorium is 42 x 48 feet, with fixed opera chairs. In the first seven rows, 40 of the chairs, of special juvenile size, are equipped with tablet arms, for classroom purposes. The stage, 31 feet wide by 13 feet deep, with blue rep draw curtains and a light-tan cyclorama, is provided with electric outlets as follows: plugs for orchestra lights and one signal bell in the face of the stage; three circuits for portable footlights; three circuits for border lights; one desk light; three stage wall plugs for lamps or spots; and two work lights. The projection booth in the rear of the auditorium has a 30-ampere power outlet for the lantern.

The activity room below the auditorium is 36 x 51 feet and may be used as a preparation room in connection with auditorium work. It serves also as a lunch, club and music room in the school program, and as a banquet room, dance and supper room for large neighborhood groups using the gymnasium.

While larger in size than usually called for in schools of this type, the gymnasium was made 50 x 70 feet because it was to be used for basketball practice by the community after school. The common locker room is equipped with two private and one large shower room. The location of the instructor's room between the locker room and the gymnasium gives efficient supervision of both units and provides for larger clinical examinations than is possible in the special nurse and clinic office on the second floor.

The kitchen off the special activity room, although compact, is well equipped with cases, counters, and rail, with slide-up windows to serve in cafeteria style. An electric ice-box, a gas stove, and a separate outside entrance provide complete service for this unit. The boiler and coal rooms, with janitor's toilet, shower and dressing room, complete the basement floor. The building has no outside steps or areas, even for service—a very practical feature in any building located in a northern latitude.

The second floor has a central art lobby at the head of the stairs, in which outstanding examples of school work and colored reproductions of famous paintings are displayed from time to time. The library classroom immediately adjoins the art lobby, and the cultural exhibits are carried over into this room, giving a pleasing effect as one comes up the stairway. Completing the floor are eight grade room units of standard size, 22 x 31 feet, and boys' and girls' toilets, centrally located.

Should the platoon or duplicate system, with sixteen units, be desired, three of the grade units could be sacrificed to form one nature study, one industrial arts room and one library, thereby providing special rooms for eight groups, including two in the gymnasium and three in the auditorium and auditorium preparation room. The special activity room could serve also for a music room, when not used for preparation work in connection with the auditorium program. On a platoon basis, the building will accommodate 640 pupils. The present capacity, on a home room basis, with ten pupil groups, is 400.

The future extension to this building calls for two wings at either end of the corridor, or a total of sixteen added classroom units, which could be rearranged for special activity rooms, corrective gymnasium, music and science rooms, as desired, to fit a duplicate program arrangement.

Heat is supplied by two self-contained steel boilers, with a low-pressure steam-vacuum system

of circulation. Classrooms have direct radiation and unit ventilators, thermostatically controlled. Toilet rooms have ceramic tile floors, glazed brick wainscot, vitreous china lavatories. Boys' and girls' toilets have wall-hung closets with hard rubber seats. The principal's office, clinic, and teachers' rest room are provided with individual toilets.

All vestibules and main foyers are wainscoted in glazed brick. Metal lockers are built into the corridor walls, and all corridors and stairways have a continuous line of metal wainscot of the same design as the locker fronts. There are no unsightly and unhygienic class coat-rooms to interfere with the flexibility of a changing school policy. The floors are of battleship linoleum, with the exception of the gymnasium, which has a maple floor, and the vestibules, main entrance foyer, and stairs, which have terrazzo and tile floors. The classrooms are equipped with 6 feet of storage cabinet space, a teacher's coat closet, and blackboards and bulletin boards at the front, rear, and side. Map rails are continuous around the room. The walls are hard-finish plaster, painted to door and bulletin-board height.

The building was completed in April, 1931. The cost of the building, including general construction, heating, ventilating, plumbing, and electric wiring, amounted to $148,804, giving a cubic foot cost of 31.9 cents, and a per pupil cost (on the platoon basis) of $232.50. The architects endeavored to make the structural forms attractive in design and color, and to use throughout the building materials that will insure positive cleanliness and sanitation with a conservative amount of service.

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

Boilers—Kewanee Boiler Co.
Classroom Furniture and Office Equipment—American Seating Co., Crocker Chair Co., Hamilton Mfg. Co.
Cleaning Equipment—Finnell System, Inc.
Clocks and Signal Systems and Fire Alarms—Standard Electric Time Co.
Drinking Fountains—The Halsey W. Taylor Co.
Exterior Building Materials—Indiana Limestone Co.
Gymnasium Equipment and Furniture—Chicago Gymnasium Equipment Co., Fred Medart Mfg. Co., Narragansett Machine Co.
Heating and Ventilating System—The Buckeye Blower Co., Warren Webster & Co.
Heat Regulating System—Johnson Service Co.
Insulation—Johns-Manville Corp.
Interior Telephone Equipment—S. H. Couch Co., Inc.
Library Equipment—The Automatic File & Index Co.
Lighting Globes and Fixtures—MacBeth-Evans Glass Co.
Lockers—Lyon Metal Products, Inc.
Piping—A. M. Byers Co.
Plumbing Fixtures and Sanitary Equipment—Kohler Co.
Showers—The Powers Regulator Co.
Stage Equipment—Acme Scenic Studios
Window Shades—Western Shade Cloth Co.

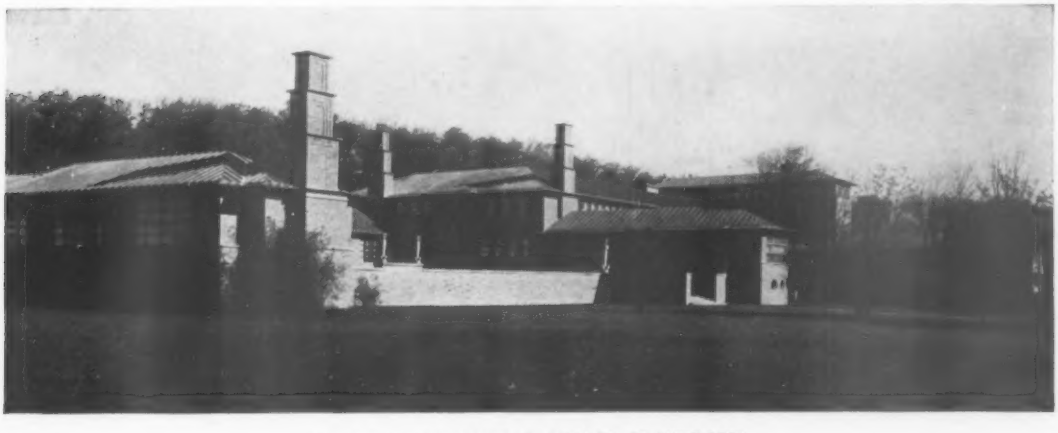
Kingswood School Cranbrook

A Preparatory School for Girls, Bloomfield Hills, Mich.

By KATHARINE ROGERS ADAMS, Ph.D.
Principal

THE sixth unit in the notable educational development of George G. Booth, the Cranbrook Foundation, is the Kingswood School for Girls. The site of Kingswood occupies fifty acres of the Cranbrook estate and is located on the shores of a small lake in a setting of wooded hills. The various elements of the school, including residence hall, auditorium, gymnasium, infirmary, classrooms, offices, and service division, are under one roof. The boarding department is planned to accommodate 54 students, and the day school 150.

There is no so-called "style" in the architecture of Kingswood School Cranbrook. Its contemporaneous character was developed by Professor Eliel Saarinen, resident architect of the Cran-

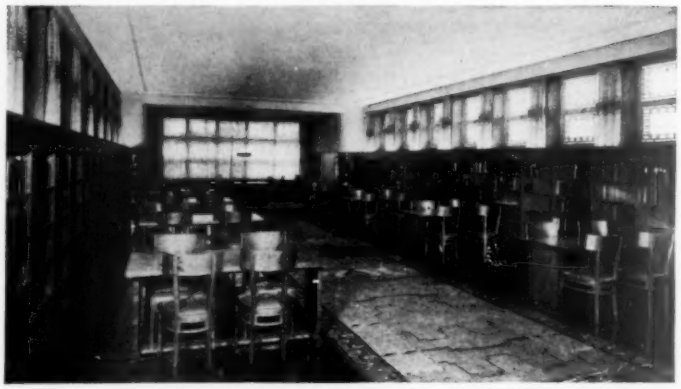


A VIEW OF KINGSWOOD SCHOOL CRANBROOK

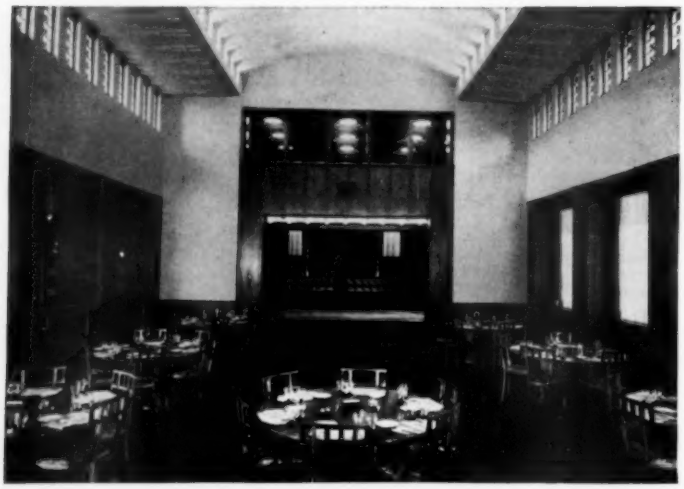
brook Foundation. Tan brick and buff mankato stone have been used for the exterior, with a roof of copper. The building occupies four levels and spreads over a large area. The school proper is on the first level, with the infirmary and residence rising to three stories and the music studios and ballroom to four stories.

Interior Decorations

Important features such as furniture, fabrics, draperies, and the iron work of the gates, courts and fireplaces were planned and made for the school in the Cranbrook Academy of Art. The building contains some of the finest examples of indirect lighting to be seen anywhere. The interior decorations were under the supervision of Mrs. Eliel Saarinen. The classroom furniture was designed by Eero Saarinen and built by a Grand Rapids firm. No two classrooms are alike in equipment and all are of the informal type, possible only where small classes prevail.



THE LIBRARY



THE DINING ROOM

The Residence

The treatment of student rooms is unusual. Dresser, desk and bookshelves are built in one piece under the windows, adding to the beauty of the room and conserving space. The hand-loomed rugs and curtains carry out a similarity in design and color. Four colors predominate, rose, green, gold and blue, to harmonize with the four color schemes used. Each room has ample closet space with full-length mirror and built-in wardrobe. The rooms are arranged for single occupancy, every two having a connecting bath. The bathrooms are finished in cream-colored tile with individual basins and cabinets, a toilet and a shower. The fixtures and plumbing in chromium plate are especially beautiful as well as modern.

The school itself and its equipment and decoration were executed with two ideas in mind: to conform to the landscape of hill and dale, lake and stream; and to express in every detail the atmosphere of a girls' private

A STUDENT ROOM

AN AIRPLANE VIEW OF KINGSWOOD SCHOOL (RIGHT FOREGROUND) AND ITS SISTER INSTITUTIONS

residence school. The effect is one of striking beauty and usefulness. Restraint and simplicity lend quiet elegance and dignity, which are carried out in every detail of the decoration and furnishing.

PRINCIPAL TYPES OF EQUIPMENT

Acoustical Treatment: Dining Hall, Auditorium and Classrooms—U. S. Gypsum Co. (Sabinite); Kitchen—Johns-Manville Co. (Sanacoustic Tile).
Auditorium Seating—Lyon Metal Products, Inc.
Blackboards—Natural Slate Blackboard Co.
Boilers—Kewanee Boiler Corp.
Bowling Alleys—Brunswick-Balke-Collender Co.
Classroom and Library Furniture—Stickley Bros.
Clocks and Signal System—International Time Recording Co.
Doors—Evans Process Hollow Door; Carnahan Mfg. Co.
Drinking Fountains—The Halsey W. Taylor Co.
Exterior Brickwork—Wyandot Clay Products Co.
Fire-Alarm System—Signal Engineering & Mfg. Co.
Gymnasium Equipment—A. G. Spalding & Bros.
Kitchen Equipment—Bernard Gloekler Co.
Laboratory Furniture—Kewaunee Mfg. Co.
Linoleum Floor Covering—Congoleum-Nairn, Inc.
Lockers—Lyon Metal Products, Inc.
Plumbing Fixtures—Standard Sanitary Co.; Piping—Wheeling Steel Corp.
Showers—Speakman Co.
Stage Equipment—Bull Dog Electric Products Co.
Stage Lighting and Switchboard—Belson Mfg. Co.; Bull Dog Electric Products Co.
Telephones—North Electric Mfg. Co.
Windows and Sash—Detroit Steel Products Co.

Screening Schools Against Insects

THE subject of screening schools is one to which sufficient attention has not yet been given. The "fly season" starts in late April in most parts of the country and lasts until late in the fall, thus taking in almost half the school year. It is well known that flies are germ-carriers, yet many schools do not even screen their kitchens and dining rooms. Pupils come from homes that are screened to schools where open windows welcome these dangerous pests.

All windows in a school building should preferably be screened, but if insufficient funds make this impossible, the rooms in which food is handled and eaten should be the first to be protected. This is required by some state laws. Screening should not be restricted to windows, but screen doors should be provided for all entrances to corridors, to other parts of the building and to the outside.

In the case of colleges, universities and private schools, dormitories should be in the same classification as eating rooms.

Probably next in importance are the toilets, rest rooms and first aid stations, followed by domestic science rooms and other laboratories of various descriptions. Gymnasiums, swimming pools and kindergartens also need protection.

The screen industry has kept well abreast of the progress that has been made in the design and erection of buildings. Bulky wooden frames and quickly deteriorating steel-wire cloth have long since been placed on the rubbish heap. Frames may now be of metal, narrow and trim to admit plenty of light and air, yet strong and rigid, affording longer life with less upkeep. The screen cloth today is of non-ferrous metal, copper or bronze being most popular, although aluminum and monel metal are often used.

The metal for frames is generally one of three kinds: galvanized steel, painted or lacquered;

solid bronze; or aluminum. Needless to say, bronze and aluminum frames have a longer life, yet frames of enameled steel have given excellent service, and many examples can be shown of screens that were installed more than a quarter of a century ago and are still in use.

In design, metal-frame screens are made to meet the requirements of practically every type of window. The more popular kinds of windows may be screened as follows:

HORIZONTAL SLIDING SCREENS ARE USED FOR THESE LIBRARY CASEMENT WINDOWS

Double-hung windows

Full-length top-hung screens (outside).

Double-vertical-sliding screens (outside).

Half-height sliding screens (outside).

Casements, opening out

Horizontal sliding screens (for double or multiple casements).

Side pivot-hung screens (single or double).

Double vertical sliding screens (where openings are not too wide).

All these screens are placed on the inside.

Casements, opening in

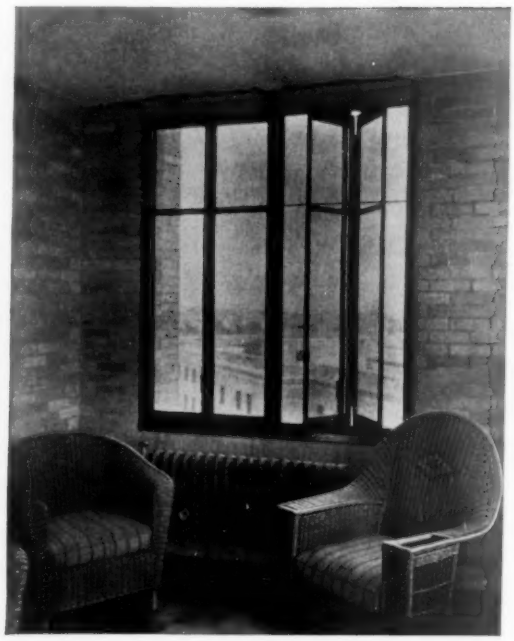
Full-length stationary screens (outside).

Full-length top pivot-hung screens (outside).

Double vertical sliding screens (outside).

Projected-type windows

For those windows which project out, the usual equipment consists of a top pivot-hung or sliding screen on the inside, covering the active ventilator only, and equipped with necessary fixtures attached permanently to the sash. The screens themselves are removable.



HORIZONTAL SLIDING SCREENS ARE ALSO USED FOR THESE FOLDING CASEMENT WINDOWS WHICH OPEN OUT

For windows that project in, a stationary screen is placed outside, with the necessary metal fixtures so that it can be removed.

Horizontally-pivoted sash

Whether the sash are of wood or metal, they

OUTSIDE DOUBLE-VERTICAL-SLIDING SCREENS ARE USED FOR THIS ORDINARY DOUBLE-HUNG WINDOW

may be screened with a flat metal-frame screen on the outside to cover the upper section of the ventilator, and with a similar screen on the inside to cover the lower part of the ventilator. Necessary fixtures are attached to the sash or to its frame.

Transoms should be treated separately. Transoms opening in should be screened with outside full-sized stationary screens. Out-swinging transoms should have inside hinged or pivoted-at-top screens.

Entrance doors should be screened with full-size, side-hung screen doors, either single or in pairs, to swing in the opposite direction to that of the entrance doors. Single screen doors should be hung from the same side of the frame as the entrance doors. Porches should be screened with full-sized stationary screens, arranged in sections to be easily removable.

Of course these descriptions are necessarily brief and cover only the more usual conditions. All the equipment mentioned permits the removal of the screens. Metal-frame screens are easily rewirable. For more detailed information or a discussion of particular problems, the various manufacturers should be consulted.

A New Central School Building

Central School District No. 6, Hancock and Tompkins, N. Y.

By ROBERT R. GRAHAM

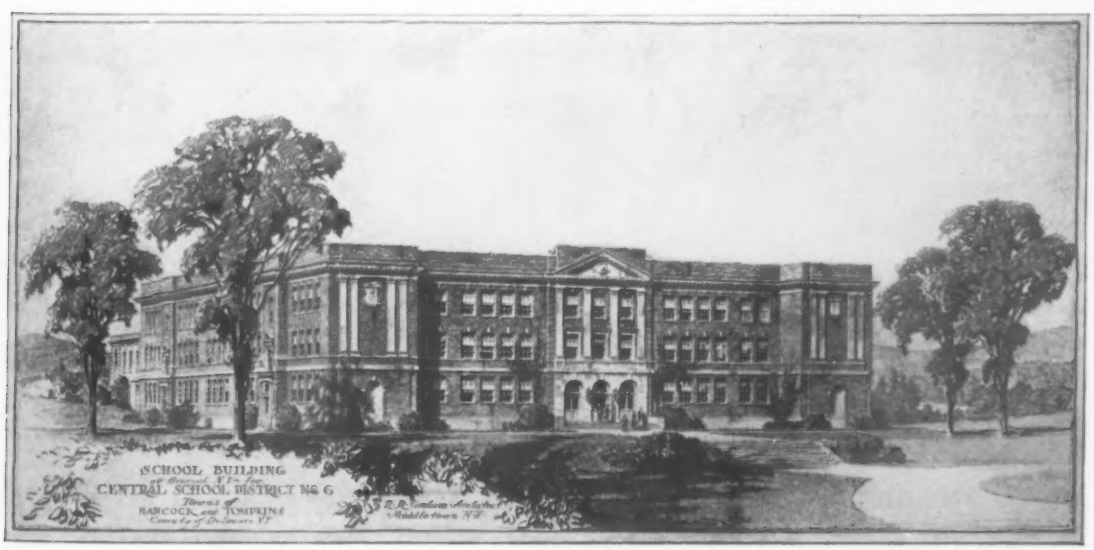
Architect, Middletown, N. Y.

WHEN the 1932 fall term opens, Central School District No. 6 of the towns of Hancock and Tompkins, N. Y., will have a thoroughly up-to-date grade and high school building with accommodations for 1,385 pupils. The building will also house a Public Library. The gymnasium and auditorium have been designed with a view to their use by the community after school hours. The structure and fixed equipment are expected to cost about $480,000, or approximately 26 cents per cubic foot. The building site occupies 12 acres, on which a swimming pool has already been built. An athletic field and playground are contemplated.

Since New York State pays one-quarter of the cost of central school buildings, plans for a proposed structure must have the approval of the State Department of Education. After the Central District Board of Education had selected an architect, and with him had determined the exact number and type of rooms required, in accordance with the attendance records of the districts forming the new Central School District, the proposed program was submitted to and accepted by the State Department. Fireproof construction and provisions for expansion without alteration were specified. The architect's sketches, prepared on the basis of the accepted program, were approved as submitted.

Construction and Equipment

The building has been designed in the late Georgian period and in the spirit of the Greek revival. It is entirely of fireproof construction except for wood doors, wood cabinets where re-



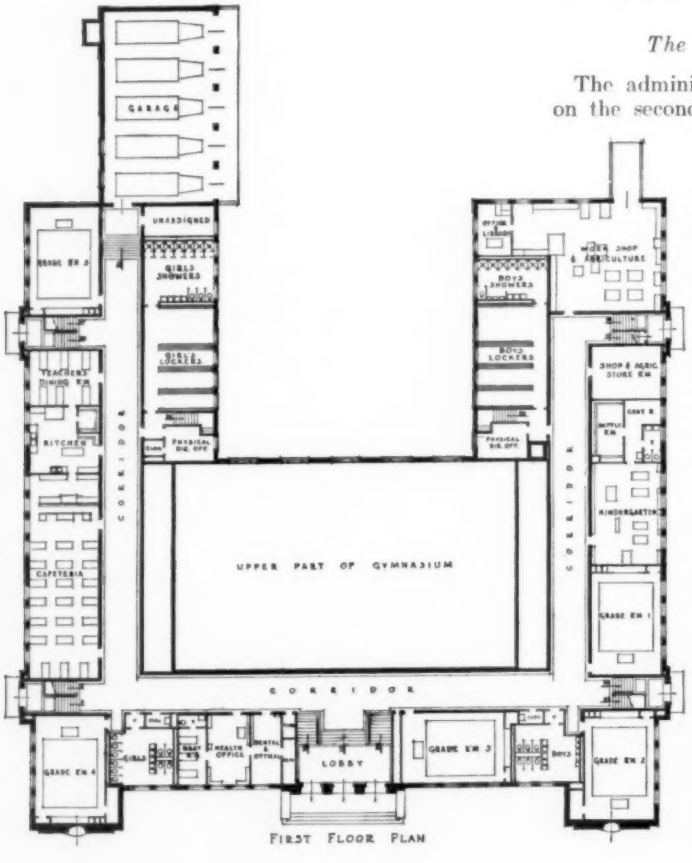
quired, and wood floors over concrete slabs. Exterior walls are of brick with stone trim. Interior non-bearing walls are of hollow tile. An entirely separate steel skeleton frame carries all live and dead loads independent of the wall construction. Four fireproof stair-towers are so arranged that the greatest distance any pupil would have to travel in case of emergency is 40 feet.

A low-pressure mechanical vacuum steam heating system is installed, and unit ventilators are placed in each room. Exhaust ducts running from each room to the roof remove foul air. The fans which ventilate the auditorium and gymnasium are placed at remote positions in order to eliminate disturbing noises. Ventilation and heating are thermostatically controlled throughout. The electric work includes the best in modern illumination in all rooms, together with a complete electric program clock system; sound motion picture equipment for the auditorium; and a centralized radio system extending to all rooms, making it possible to give announcements direct from the principal's office.

The Basement and First Floor

The only parts of the basement that have been excavated are in the central portion of the building, and the northeast wing, i.e., the space under the workshop and the boys' shower and locker rooms. In the wing are the boiler room, coal storage room, switchboard and transformer rooms. About 350 tons of coal can be stored. In the center of the building, at a higher level—approximately four feet below the finished grade lines—is the gymnasium. It is reached by the public by two stairways from the main entrance lobby on the first floor. The stairways open into a lobby on the gymnasium floor, on either side of which are check rooms. Inside the gymnasium on each side of the entrance are seats arranged in tiers. At each end of the room is storage space for equipment, and on either side of the windows are stairs leading to the girls' and boys' locker and shower rooms on the first floor. The stairs also lead directly outdoors for access to the athletic field.

As indicated by the plan, the first floor also contains classrooms, the shop and agricultural department, a kindergarten, toilets, health rooms, a cafeteria, kitchen, teachers' dining room, and a garage for busses, which makes it possible for children from outlying districts to be brought directly into the building. Corridor, shower-room and toilet-room floors are of terrazzo, and the partitions in the toilets and showers are of Tennessee marble.



FIRST FLOOR PLAN

The Second and Third Floors

The administration rooms and auditorium are on the second floor, since it is midway between the first and third floors and thus more accessible to all pupils. The administration rooms include a general office with fireproof vault and small radio equipment room, a private office for the principal and a private office for the Board of Education. On each side of these offices are teachers' rooms, one for men and one for women teachers. A considerable saving in cost was effected by placing the auditorium over the gymnasium. A grade entrance from Vestal Avenue provides convenient access from the street to the auditorium and also to the Public Library, which is directly over the bus storage room. The auditorium seats approximately 650 on the main floor. It has its own lobby with large check rooms on either side for the use of the public during entertainments in the hall. The auditorium floor slopes about three feet toward the stage, which is at corridor level.

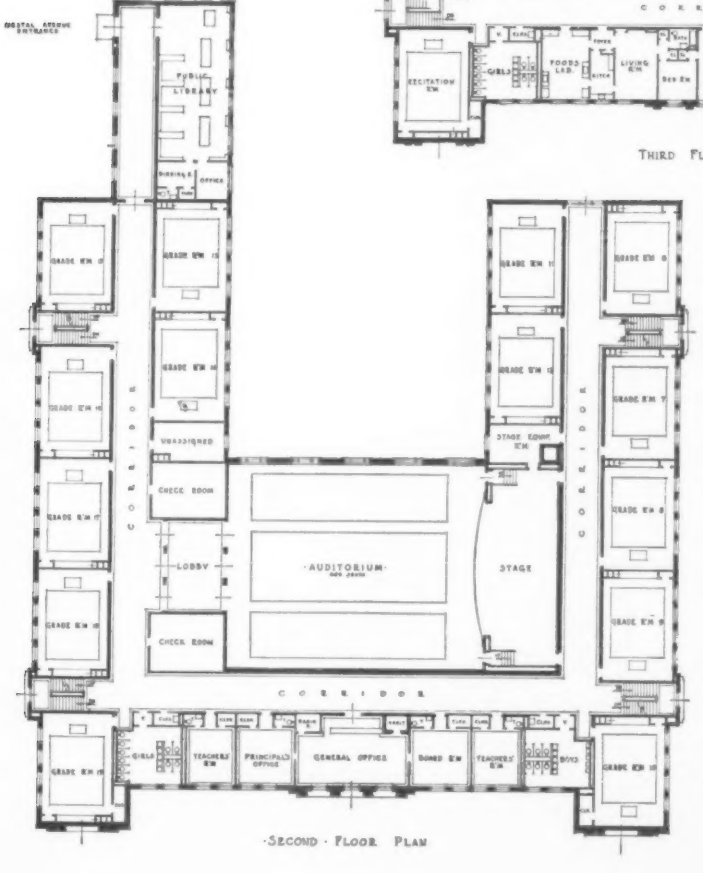
All classrooms on the first and second floors, and one on the third floor, are for the grades;

each is planned to seat forty pupils, the maximum allowed by the State Department. The high school department, on the third floor, is provided with a library, a study hall, four forty-pupil recitation rooms, four twenty-pupil recitation rooms, and facilities for science, home economics, typewriting and bookkeeping, music and drawing. The home economics department includes a food laboratory, a small model apartment and a large clothing and sewing room, all furnished with modern equipment. Surrounding the sides of the upper part of the auditorium on the third floor are lockers, flush with the corridor walls, for the use of the high school pupils.

Superior Materials and Methods of Construction

Superior materials have been used throughout the building, with the thought that such materials are cheaper in the long run because of the reduced cost of upkeep. Only those methods of construction that are consistent with good engineering practice were used. By building at this time, the Central School District has been able to take advantage of construction costs that are lower than at any time during the past ten years.

THIRD FLOOR PLAN



SECOND FLOOR PLAN

PRINCIPAL TYPES OF EQUIPMENT

Boilers—Heggie-Simplex Boiler Co.
Clocks and Signal Systems—Standard Electric Time Co.
Damp-proofing—Par-Lock Co.
Drinking Fountains, Plumbing Fixtures and Sanitary Supplies—Standard Sanitary Mfg. Co.
Fire Alarms—Holtzer-Cabot Electric Co.
Heating and Ventilating System—John J. Nesbitt Co.; Warren Webster & Co.
Heat Regulating System—Johnson Service Co.
Insulation—The Celotex Co.
Lighting Globes and Fixtures—Graybar Electric Co.
Lockers—Narragansett Machine Co.
Radio Equipment—R. C. A. Victor Co., Inc.
Roof Construction and Door Bucks—Kalman Steel Corp.
Roofing—The Barrett Co.
Window Shades—Interstate Shade Cloth Co.

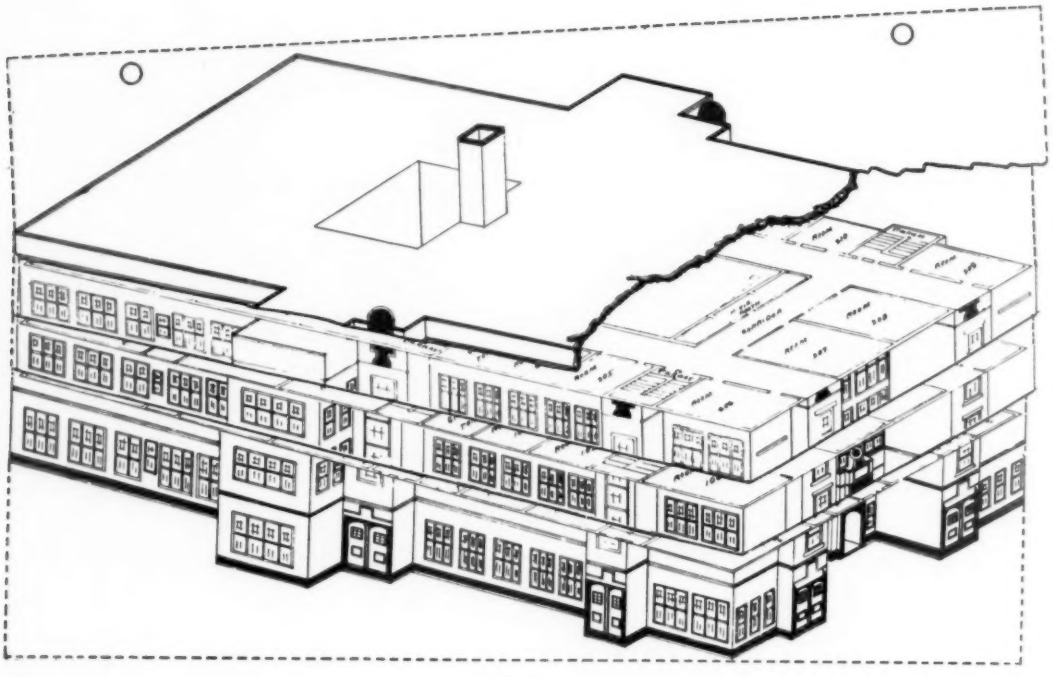


FIGURE 1

Presenting Floor Plans to the Public

By CARTER ALEXANDER

Professor of Education, Teachers College, Columbia University

THE device here described and illustrated is a novel and effective method for superintendents to use in presenting the floor plans of a school building to the public. It consists of an isometric drawing for each story of the building, each showing the floor plan and two sides of the exterior of the building. The drawings are then blueprinted on sheets large enough to show the ground floor. The prints for the upper stories are cut at the bottom along the base lines of the stories. The other three sides of the sheets are left untouched. When the sheets are superim-

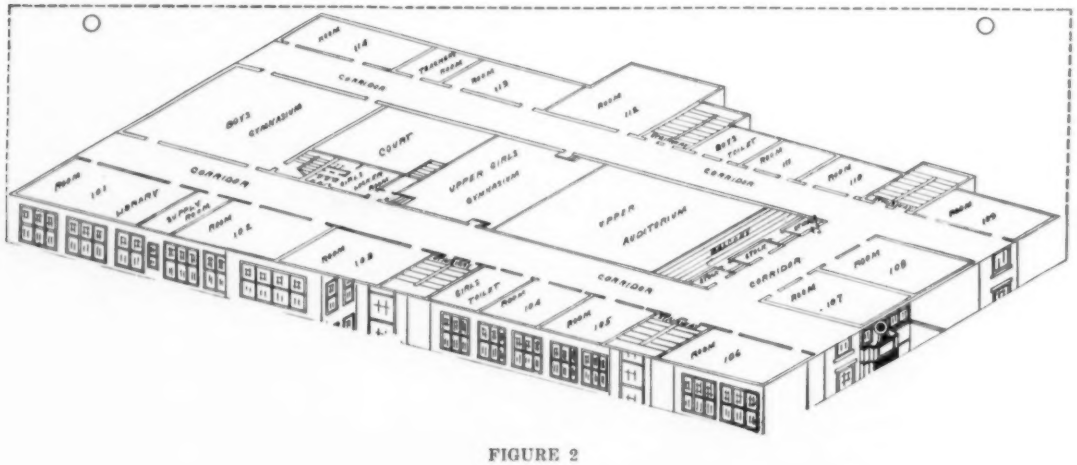


FIGURE 2

posed, they show the exterior and roof of the building as in Figure 1, but they can be easily lifted by any one interested in the plans of a particular floor.

Figure 2 shows the blueprint for the second story as a sample.

The writer has never seen a better space-saving device for giving the public a clear conception of the plans for a new building. Dimensional figures can be given on the drawings, but for popular consumption such figures will seldom be necessary. The scheme is very easy to use, for any mechanical drawing department with access to blueprinting facilities can make the drawings and prints. It would be possible to produce the sheets by stencil mimeographs, but the results would not be so good as with blueprints.

The device was recently called to the writer's attention by Principal William F. Halloran of the Theodore Roosevelt Junior High School at Elizabeth, N. J. It was originated over a year ago by Walter Sztogryn, a ninth-grade student, and perfected by him under Herbert McBride, mechanical drawing instructor for the school. Young Sztogryn hit upon the idea in the course of working out plans for a new laundry building for his father's extensive chain of laundries.

Planning Schools for a City of Under 100,000

By E. W. JONES

Superintendent of Schools, Shreveport, La.

THE following discussion is not limited in the sense that the title might indicate, for two reasons: first, because there is no particular difference in modern schools, whether they are in large or in small centers; and, second, because schools planned for a small city are, for the most part, still going to be used when the city has doubled and redoubled in population.

Local Needs and Standard Requirements Must Be Met

A school system's size does not determine its needs to the extent that other factors may. Before a definite plan can be intelligently made, the requirements of each particular section of the city must be analyzed, keeping in mind the system as a whole. A Board of Education will, of course, build according to the needs of its local system rather than copy the schools of another community. A city operating on the platoon system will not follow the same plan as one not using it. Such considerations as whether or not junior high schools, kindergartens, vocational training, etc., are to be provided for will also influence the program to a great extent.

In the past we planned cheap buildings to suit our purpose, and they were usually unfit for schools. In recent years the American people have determined to give their children safe and comfortable buildings, let the cost be what it may. Once debatable features are now conceded to be as necessary as classrooms. Schools, for example, should be fireproof. Modern architecture has fortunately made this feature cost but little extra.* Auditoriums and cafeterias are necessities in both elementary and high schools. A clinic for the health program will surely be found in all future buildings. In the same way in the future we shall accept additional requirements for the schools.

* See the article on "Building Fire-Safe Schools," p. 42.

The Advantages of Advance Planning

If a superintendent were assured that his plan of education, once adopted, would not be varied, he would still not have an ideal situation unless he had been on the ground before the city itself was established and had reserved school sites in advance. Unfortunately, we never work under such conditions. Most of us have inherited the problem of relieving overcrowded schools and revamping the curriculum. We have only the alternative of establishing new buildings or enlarging old ones. Just which course to pursue in each case should be studied carefully before reaching a conclusion.

Has the school needing relief reached the size accepted as the economical working unit? Is the site sufficient for an additional building and playground? Have provisions been made for adding to the building? When these questions are answered, a school population map should be prepared, no matter how familiar the school authorities may be with their city. Such a map will often put a new light upon the existing situation. Every one is familiar with the pin map so much used by industrial concerns. The few hours spent in preparing one for a building survey is well worth the cost and effort. Assuming that all political and real estate interests can be eliminated, such a map indicates where a new building should be located much more accurately than any amount of guesswork. It is then necessary to estimate the trend of future development, to see the available property, and to secure the price.

Relieving an Overcrowded School

Such a study as I have mentioned was made in Shreveport. One school was greatly overcrowded. We had practically determined upon a new building, but our map revealed the fact that

Edward F. Neild, Shreveport, Architect

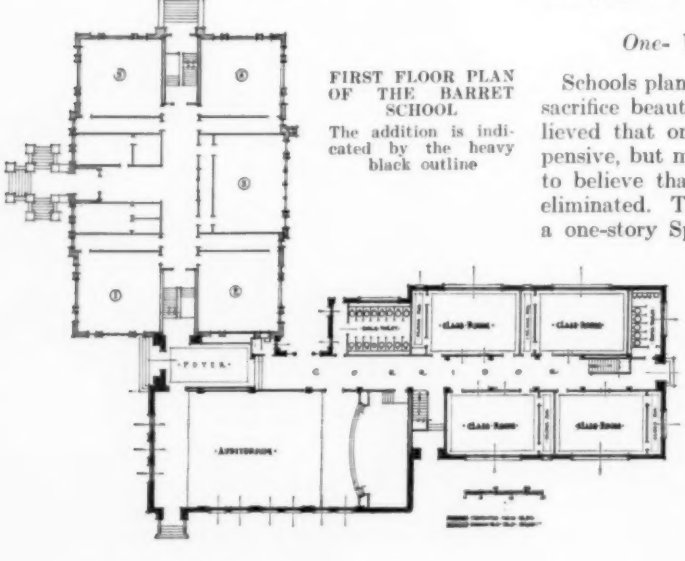
AN EXAMPLE OF HOW A BUILDING NOT PLANNED FOR EXPANSION CAN BE ADDED TO

The Barret School, Shreveport, La., was enlarged by the addition of a two-story auditorium and classroom wing, with little sacrifice to the convenience and appearance of the main building

the use of any available site would necessitate the children's going a greater distance to a new school than to the old one needing relief. We finally decided to add to the existing building, although it was a "finished" type with no provisions for enlargement. I use this illustration because I am sure it is typical of the problem confronting practically every school man in the American city of normal growth.

We had to consider the least possible sacrifice of space in the old building, and the convenience and the finished appearance of the addition. The original building was two stories high, and had square rooms with windows on two sides. The accompanying photograph and floor plan show the completed unit. The architect's first plan placed the annex in the rear center, destroying, of course, Room 3 and the room above. This and other plans were discarded in favor of the wing shown in heavy outline. The only light disturbed is that of Room 2, but the angle of the building is so arranged that the room is still well lighted on one side.

The classroom portion of the addition is two stories, and the rooms are all of accepted proportion and lighting. The auditorium is so located that it can be used even during school hours without disturbing the classrooms. Like many former buildings, this one included an expensive half basement without any particular purpose. We converted the space under Rooms 1 and 5, for the entire length of the building, into a cafeteria, changing two windows into doors.



FIRST FLOOR PLAN OF THE BARRET SCHOOL

The addition is indicated by the heavy black outline

One- Versus Two-Story Buildings

Schools planned by a capable architect need not sacrifice beauty to economy. It is generally believed that one-story buildings are far more expensive, but my recent experience has not led me to believe that the one-story building should be eliminated. The accompanying photograph shows a one-story Spanish-type school which bears the name of A. C. Steere, who made it possible for us to use this plan, by donating a large site in Shreveport's most beautiful subdivision. The group of six Spanish-type residences are typical of the homes of this section of the city, and they determined the character of the school building. Any other architecture would be conspicuous and decidedly out of place. The Spanish motif has been applied to

THE A. C. STEERE SCHOOL, SHREVEPORT, LA., IS A SUCCESSFUL EXAMPLE OF A ONE-STORY BUILDING

the interior as well as the exterior outlines. The same year, we erected a two-story building of the same capacity, the cost being only $6,000 less than the cost of this one. Surely it is worth that difference to have a building of this type where it is located.

The Financial Aspect of Planning

I said in the beginning that the American people had been very generous in financing schools. Many taxpayers rightfully ask whether we have not been extravagant. I believe that much of the ornamentation of our schools not only is extravagance, but will hasten the time when a building will become obsolete. Not only can we eliminate many of the expensive features which many architects suggest, but the school man who keeps up with developments can save a great deal in small details. For example, a slate blackboard, if placed at the proper height for various grades, need not be nearly so wide as generally used. This item alone in a large building may make quite a saving. Equipment should be selected when a building is being planned, and every room should be built to accommodate the equipment, providing proper aisle space and no more. Much of our tax money has gone into unusable floor space.

No one is wise enough to predict the future needs of our schools; therefore, no building should be erected without provisions for extension. If this is wisely done, we shall no longer need to build so much for the future, tying up money in unused space. The American city of approximately 100,000 population ought to build on a cash basis. Too much of our money has gone into the payment of interest instead of into classrooms. My own city went on a cash basis six years ago. We have probably the average increase of school population, and are providing amply by spending annually the proceeds of a one-mill tax. We have the advantage of working under a parish (county unit) system of financing independently of other governmental bodies. The tax is assessed upon the city proper and upon the adjacent territory sending children into the city to school. The property assessment is $140,000,000; we have therefore $140,000 available annually, exclusively for building. We plan and spend annually for our immediate needs, and unless we should have an unprecedented growth we shall never carry any indebtedness.

Science Replacing Guesswork

Scientific school planning is taking the place of guesswork. It is a job for the school executive rather than the architect, and a responsibility not to be shirked. Compensation comes from the satisfaction of seeing the city's funds well spent and its schools well planned.

TYPICAL RESIDENCES NEAR THE A. C. STEERE SCHOOL, SHOWN ABOVE

Recent Publications in the School-Building Field

A Selected List Compiled for The American School and University

By JOHN W. SAHLSTROM

Associate in Educational Administration, Teachers College, Columbia University

Public School Reference Number.—The Architectural Forum, December, 1931. The Architectural Forum, New York. 138 pp. $3.00.

This issue assembles a group of articles by nationally known educators and architects in the field of school planning and designing. Illustrations and floor plans of recent and notable school construction accompany the text. The articles treat of modern trends, construction for multiple use, planning, board and architect relationship, some ideas from European schools, building economies, structural features, lighting, ventilating, and sanitary features.

Standards for Junior High School Buildings.—By N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University. 1932. 155 pp. (In press.)

The latest of the series of standards for public school buildings establishes standards for physical facilities to be included in the modern junior high school building.

Survey Field Book for the Analysis of a High School Building.—N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University. 1932. 60¢.

A convenient pamphlet of blank forms to be used in recording data in connection with the use of the "Standards for High School Buildings," by G. D. Strayer and N. L. Engelhardt.

Survey Data Book for Public School Janitorial-Engineering Service.—By N. L. Engelhardt, C. E. Reeves, and G. F. Womrath. Bureau of Publications, Teachers College, Columbia University. 1932. 85 pp. (In press.)

Combines the standards by the same authors, with forms for recording data and rating the service. May be used to advantage either in the appraisal of a single service or in more extensive surveys.

Bonding Versus Pay-As-You-Go.—By Don L. Essex. Bureau of Publications, Teachers College, Columbia University. 1931. 101 pp. $1.50.

A scientific analysis of the relative merits of the two plans. The economic effects of recurrent borrowing, and the failure of the pay-as-you-go plan to provide facilities when needed, are problems discussed. The author concludes that no single plan is satisfactory or desirable under all circumstances, and advances a suggested policy which eliminates in part the disadvantages of both the pay-as-you-go and the borrowing plan.

School Building Survey and Program for Fordson School District, Dearborn, Mich.—Bureau of Research and Statistics, Fordson Public Schools, Dearborn, Mich. 1931. 72 pp. $1.00.

A significant survey which introduces new techniques in population and building utilization studies. The charts and maps are well done, and in some cases represent departures from usual methods.

Planning Residence Halls.—By Harriet Hayes. Bureau of Publications, Teachers College, Columbia University. 1932. 247 pp. $2.25.

A handbook for the use of college officers and members of building committees. Part One includes the essential details of preliminary considerations; Part Two develops the desirable physical facilities to be included; Part Three sets up provisions for safety and general welfare with reference to heating, ventilating, and lighting.

The Outlook for Rural Education.—Research Bulletin of the National Education Association, Washington, D. C. 1931. 302 pp. 25¢.

This contains a summary of certain state standards for rural school buildings; a brief discussion of the rural school building problem; and a bibliography (pp. 286-294).

School Ventilation—Principles and Practices.—New York Commission on Ventilation. Bureau of Publications, Teachers College, Columbia University. 1931. 73 pp. $1.00.

Final contribution of the Commission, whose work was financed by the Milbank Memorial Fund, 1913-1923, 1926-1929. The summary of conclusions is most significant in that it finds no justification for the extensive mechanical equipment so generally required by law and practice.

Safeguarding the School Board's Purchase of Architects' Working Drawings.—By A. M. Proctor. Bureau of Publications, Teachers College, Columbia University. 1932. 138 pp. $2.00.

The author, after an analysis of state participation in checking architectural service, proceeds to show wherein working drawings have failed in the service for which they were intended. From a critical study of 130 sets of working drawings, a comprehensive checking list is developed whereby defects or omissions can easily be detected.

Score Card for Junior High School Buildings.—By George D. Strayer and N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University. 1932. 15¢.

A one-thousand point rating scale, with sub-values apportioned to the various physical elements comprising the junior high school plant. To be used with the "Standards for Junior High School Buildings," by N. L. Engelhardt, as a basis.

The Status of Natural Lighting in Modern Building Codes.—By George W. Thomas. Illuminating Engineering Society, New York. 1931. 14 pp. 10¢.

A technical and critical analysis of the natural lighting requirements as usually set forth in local building codes. The author also gives ten rules that may be incorporated into future building codes so that responsible authorities may be guided toward more satisfactory results from the standpoint of natural lighting.

Study of Rural School Ventilation: The School Ventilation Study for Cattaraugus County, New York, 1926-1927. U. S. Public Health Report 44, No. 40. Reprint No. 1320:1-28, 1930. 10¢.

A report on one of the three field studies of the New York Commission on Ventilation, following its reorganization in 1926. The study was undertaken to determine just what were the air conditions in one- and two-room rural schools, with the secondary purpose of learning how these air conditions affected the health of the pupils.

Efficient Business Administration of Public Schools.—By George F. Womrath. The Bruce Publishing Company, Milwaukee, Wis. 1932. 463 pp. $3.75.

An extensive and valuable treatment of the business aspects of administering a public school system. The emphasis of the volume is on the construction and maintenance of buildings, with significant chapters on supply management and cost analysis.

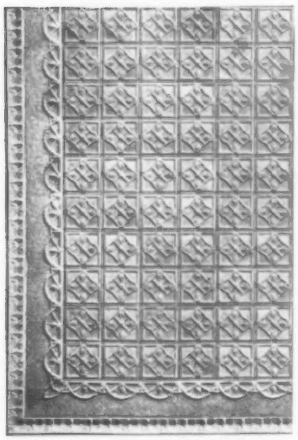
This list supplements the bibliography published in the 1931–1932 Edition of The American School and University (page 30).

BERGER BUILDING DIVISION

OF TRUSCON STEEL COMPANY

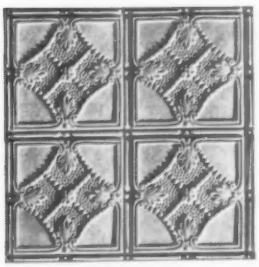
Canton, Ohio

Steel Ceilings and Sidewalls



NO. 5074 CEILING DESIGN

CORNICE



PLATE

Berloy Steel Ceilings and Sidewalls are made in a wide variety of designs and are easily adapted to any scheme of interior decoration. They possess decorative properties equal to molded plaster and permit the greatest possible light reflection, hence, they are ideal for schools where durability of construction is essential and where economy of first cost and maintenance must be considered.

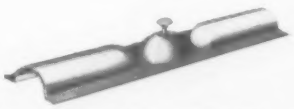
Steel ceilings offer a solid barrier to fire and have proved their value in hundreds of cases. Not only are they non-combustible, but they serve to prevent the spread of the flames. This makes them especially valuable for use in schools, where the safety of the students is of prime importance.

Because they do not crack or fall off, steel ceilings perform another safety function. Installed, they weigh approximately 75 pounds per square foot as compared with several times that for plaster. On long spans, this saving in weight is important.

The smooth surface of the steel ceilings is easily kept clean and bright with soap and water. Repainting, when necessary, is economical and quickly done. The accurately formed units, in attractive designs, develop a beautiful, safe, sanitary and permanent ceiling at a cost surprisingly low.

A BERLOY FEATURE

The exclusive Bead and Button construction develops a perfect joint, simplifies erection and and assures full satisfaction.



BEAD AND BUTTON CONSTRUCTION

TRUSCON STEEL COMPANY

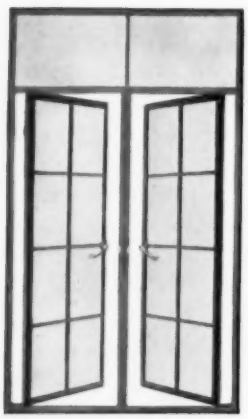
Youngstown, Ohio

Engineering and Sales Offices in All Principal Cities

PLANTS IN: Youngstown, Cleveland, Detroit, Los Angeles, Walkerville, Ont., Japan, Buenos Aires

Manufacturers of a Complete Line of
STEEL BUILDING PRODUCTS FOR SCHOOLS

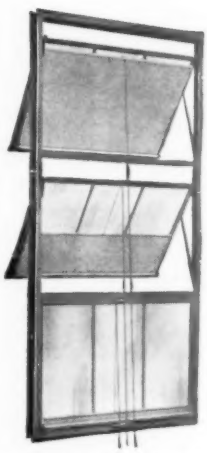
MODERN SCHOOL WINDOWS
Steel, Aluminum, Bronze



STEEL CASEMENT

DOUBLE-HUNG WINDOW

Truscon has developed types of windows to meet the various requirements of modern school design. These include light, intermediate and heavy casements, double-hung windows, projected windows and the improved, scientific Donovan Awning type which provides unexcelled lighting and ventilation features combined with efficient and economical design. Truscon windows for schools are available in a complete range of sizes in steel, aluminum and bronze.



DONOVAN WINDOW

FERROCOUSTIC ROOF DECK

Insulated and Waterproofed

This type of roof is ideal for use over auditoriums, gymnasiums, swimming pools or other rooms where reverberation is liable to cause annoyance. It combines all the advantages of a steeldeck roof with the corrective qualities of acoustical treatment.

The efficiency and economy of Ferrocoustic lies in the use of the steeldeck as both roof and acoustical treatment. As a roof, it is light in weight, firesafe, strong and forms an ideal base for the waterproofing. As an acoustical treatment, it provides sound-quieting and improves the hearing conditions of the auditorium. The acoustical board is held firmly by the flanges of the deck to provide a smooth, attractive ceiling.

Insulmesh Plaster Base

it Reinforces—it Insulates—it Deadens Sound

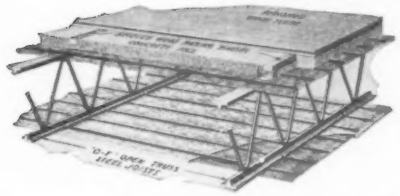
Truscon Insulmesh combines in one product remarkable sound-deadening qualities, the low first cost of wood lath, the firesafety and crack prevention of metal lath and the plaster economy and insulating ability of fibre and plaster boards. It consists of expanded metal which is firmly fastened to a specially treated, 3/8" thick waterproofed backing, corrugated to provide dead air cells that form an insulation against heat and sound.

The sheets are easy to handle and erect. A special feature is the continuous reinforcement over the joints, obtained by having the mesh overlap on two sides of the sheet.

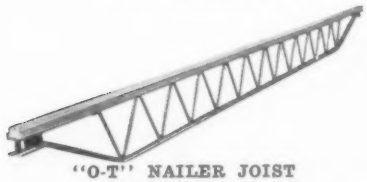
Metal Lath and Accessories

Truscon manufactures a complete line of standard and specialty metal lath for every purpose; also corner bead, strip-ite, pencil rods, base screed and various other high-quality accessories.

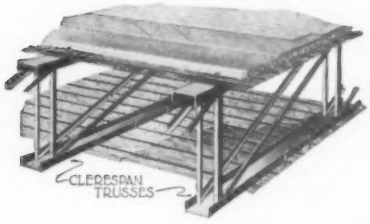
Fireproof Floors



"O-T" STEEL JOIST



"O-T" NAILER JOIST



To meet the demand for economical, light weight and fireproof floors, Truscon has developed the "O-T" Open Truss Steel Joist which is designed in accordance with the best engineering practice and offers many advantageous and distinctive features. The entire design is unusually efficient as well as exceptionally economical of materials.

Fundamentally, the Open Truss Steel Joist is a Warren truss having top and bottom chords of wide tee-shaped members to provide the greatest resistance to buckling strains. The bottom chord is continuous to the bearings, where it is welded to the web plate and top chord to form a solid I-beam. Web members are continuous from end to end.

The underslung design of the bearing permits maximum headroom and the open web permits the passage of conduits and pipes of any number and in any direction.

CLERESPAN TRUSSES

Clerespan Trusses have been developed to make available larger unobstructed areas in floor space and thus permit greater flexibility in the arrangement and design of the interior of the building. These are made entirely of hot-rolled structural angles to form a box type girder having a double web system, with all joints electric pressure welded. Clear Spans up to 56 feet can be obtained.

CONGOLEUM-NAIRN INC.

General Office: Kearny, New Jersey

The wide use of Sealex Linoleum Floors in schools and colleges throughout the country constitutes an ever-growing recognition of their aesthetic and practical advantages.

Among the many types and patterns of Sealex materials are floors for every area in the school. The more decorative, such as Sealex Veltone Linoleum and Sealex Treadlite Linoleum Tile, are thoroughly appropriate for the administrative offices, entrance lobby and auditorium. Solid-colored Sealex Battleship Linoleum and two-toned Sealex Jaspé Linoleum, both heavy-duty materials, are suitable for classrooms, corridors and gymnasium. Ready-made patterns in Sealex Inlaid Linoleum make ideal floors for the school cafeteria.

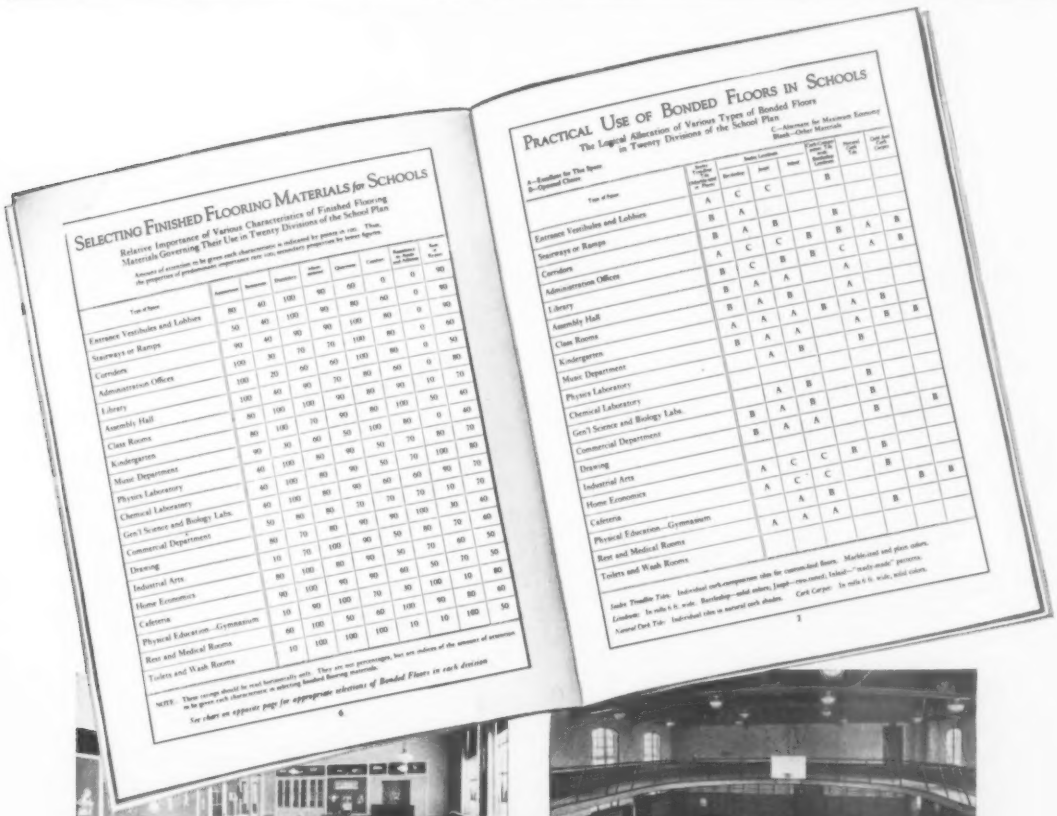
Any of these materials may be installed in new buildings or in the remodeling of older structures. In either case, the cost is moderate—well within the school budget. Maintenance is easy and inexpensive, washing and waxing are usually necessary at vacation times only—summer, Christmas and spring. In between, dry mopping or push broom cleaning will keep the floors in good condition. Refinishing is never necessary.

Ink, grease, liquids and other foreign substances cannot become imbedded in a Sealex Floor. The Sealex Process, by which these floors are manufactured, hermetically seals every tiny linoleum "pore." Dirt and dust can find no lodging place.

Sealex Floors **are** cork-composition. Hence, they are resiliently comfortable to walk upon. "Heel shock"—that tiny jarring sensation felt when the heel meets a hard surface and which is a primary cause of fatigue—is eliminated.

Another desirable advantage of Sealex Floors is their sound-absorbing quality. They are quiet floors—noisy footsteps are muffled.

Sealex custom-built floors are made to your order. They may be of Sealex Treadlite Linoleum Tile (in any colors and sizes you choose) or they may be one of our standard patterns with special Sealex Linsignia insets. For instance, the floor in the picture is Sealex Veltone Linoleum with a specially designed "geographical" Linsignia—instructive as well as decorative.



SELECTING FINISHED FLOORING MATERIALS for SCHOOLS

Relative Importance of Various Characteristics of Finished Flooring Materials Governing Their Use in Twenty Divisions of the School Plan

Type of Room	Resilience	Resistance	Durability	Sound-deadening	Quietness	Comfort	Resistance to Stains and Solvents	Ease of Keeping Clean
Entrance Vestibules and Lobbies	80	60	100	90	60	0	0	90
Stairways or Ramps	50	40	100	90	80	60	0	80
Corridors	90	40	90	90	100	80	0	90
Administration Offices	100	30	70	70	100	80	0	50
Library	100	20	60	60	100	80	0	80
Assembly Hall	100	60	90	70	80	50	0	80
Class Rooms	80	100	100	90	80	90	10	70
Kindergarten	80	100	70	90	80	100	50	60
Music Department	90	30	60	50	100	80	0	40
Physics Laboratory	60	100	80	90	90	50	70	80	70
Chemical Laboratory	60	100	80	90	90	50	70	100	80
Gen'l Science and Biology Labs.	60	100	80	90	90	60	60	90	70
Commercial Department	50	80	80	70	70	70	70	10	70
Drawing	80	70	80	90	90	50	80	30	60
Industrial Arts	10	70	100	90	90	50	70	60	50
Home Economics	80	100	80	90	90	60	50	70	50
Cafeteria	90	100	90	90	90	60	100	10	80
Physical Education—Gymnasium	10	90	100	70	70	80	90	80	60
Rest and Medical Rooms	60	100	50	60	100	90	80	80	60
Toilets and Wash Rooms	10	100	100	100	100	10	10	100	50

NOTE: These ratings should be read horizontally only. They are not percentages, but are indices of the amount of attention to be given each characteristic in selecting bonded flooring materials.

See chart on opposite page for appropriate selections of Bonded Floors in each division

6

PRACTICAL USE OF BONDED FLOORS IN SCHOOLS

The Logical Allocation of Various Types of Bonded Floors in Twenty Divisions of the School Plan

A—Excellent for The Space
B—Optional Choice
C—Alternate for Maximum Economy
Blank—Other Materials

Type of Room	Asphalt Tile, Cork Tile or Rubber Tile	Battleship Linoleum	Jaspé Linoleum	Inlaid Linoleum	Cork Carpet	Natural Cork	Cork Tile Carpet
Entrance Vestibules and Lobbies	A	C	C		B		
Stairways or Ramps	B	A					
Corridors	B	A	B		B	A	B
Administration Offices	A	C	C	B	B	A	B
Library	B	C	B	B	C		
Assembly Hall	B	C	B		A		
Class Rooms	B	A	A				
Kindergarten	B	A	A	B	A	B	
Music Department	A	A	A		A	B	B
Physics Laboratory	B	A	A		B		
Chemical Laboratory			A	B		B	
Gen'l Science and Biology Labs.			A	B		B	
Commercial Department	B	A	A			B	B
Drawing	B	A	A				
Industrial Arts							
Home Economics	A	C	C	B	B		
Cafeteria	A	C	C			B	B
Physical Education—Gymnasium		A	B				
Rest and Medical Rooms	A	A	A				
Toilets and Wash Rooms							

Jaspé Tinsdale Tile: Individual cork-composition tiles for custom-laid floors. Marble-veined and plain colors.
Linoleum: In rolls 6 ft. wide. Battleship—solid colors; Jaspé—mix-veined; Inlaid—"mosaic-made" patterns.
Natural Cork Tile: Individual tiles in natural cork shades. Cork Carpet: In rolls 6 ft. wide, solid colors.

7

Above—Custom-designed Sealex game floor in the kindergarten in the Lake Shore School, Grosse Pointe, Michigan

Above—A Sealex Linoleum gymnasium floor, with inlaid markers of contrasting colored linoleum, in Blackhawk Park Field House, Chicago

"Facts You Should Know About Resilient Floors for Schools" is a concise study prepared for us by architects. It contains sound recommendations and self-explanatory charts which will guide you in your selection of the proper floor. This book is offered to you gratis—on request.

Sealex materials installed by authorized contractors of Bonded Floors are backed by Guaranty Bonds issued by the U. S. Fidelity and Guaranty Company. These contractors are located throughout the country. Write us for their names or for any information or service you may require in connection with resilient floors —no obligation, of course.

CONGOLEUM-NAIRN INC.
KEARNY, N. J.

SEALEX LINOLEUM
Stain-proof Easily Cleaned
SATISFACTION GUARANTEED OR YOUR MONEY BACK

Above—A quiet, comfortable and durable floor of Sealex Jaspé Linoleum, in the Regina High School, Norwood, Ohio

GRAYBAR ELECTRIC COMPANY

Executive Office: Graybar Building, Lexington Ave. and 43rd Street
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Charlotte, N. C.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
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ELECTRIC COMPANY

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Memphis, Tenn.
Miami, Fla.
Milwaukee, Wis.
Minneapolis, Minn.
Mt. Vernon, N. Y.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Newark, N. J.
Norfolk, Va.
Oakland, Calif.
Oklahoma City, Okla.
Omaha, Nebr.
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Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Reading, Pa.
Richmond, Va.
Roanoke, Va.
Rochester, N. Y.
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St. Paul, Minn.
Salt Lake City, Utah
San Antonio, Texas
San Francisco, Calif.
Savannah, Ga.
Seattle, Wash.
Spokane, Wash.
Syracuse, N. Y.
Tacoma, Wash.
Tampa, Fla.
Toledo, Ohio
Washington, D. C.
Wichita, Kan.
Worcester, Mass.
Youngstown, Ohio

Graybar Inter-Phones

The best practice in educational construction work recognizes the importance of a swift and dependable interior telephone system.

Leading architects engaged in planning new school and college buildings consider Inter-Phones an essential part of the design and equipment. School boards very definitely appreciate the importance of this telephone system that knits all the individuals of the teaching staff together—without, at the same time, requiring the services of an operator.

CRADLE HAND SET

Coupled with their extreme simplicity—the user merely pushes a button to make the desired connection — Graybar Inter-Phones are reliable in the extreme. Associated with them is over a half century of experience in the supplying of telephones and telephone equipment. In addition to this, the longest record of service in the field of sound transmission, are the high precision standards to which Graybar Inter-Phones are built and tested.

ITS RECORD

The most conclusive proof of the high quality of Graybar Inter-Phones is their performance in actual service. Inter-Phones have been installed in schools and colleges from coast to coast, rendering in every case satisfactory service.

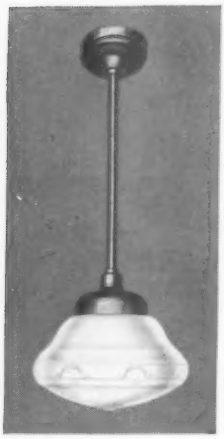
WALL TYPE

Inter-Phones are made in various styles to meet a wide variety of requirements. On this page are shown two such styles.

One is the wall type; the other is the cradle hand set type.

The selection of the proper type of Inter-Phone is considerably simplified by the large amount of information and experience records available. Graybar Inter-Phone specialists will be glad to place this material at the disposal of architects and school boards.

School and College Lighting Equipment



THE SHELCREST "66" GLOBE, DECORATED

Adequate lighting with proper diffusion and without glare is a fundamental requirement for every school and college building. The Graybar Electric Company has given the problem of proper school lighting special study and has developed a line of lighting fixtures and glassware well suited to school and college needs.

Wide Choice of Equipment

Graybar offers a wide choice in lighting fixtures of hanging or ceiling type with a variety of glassware for direct or semi-indirect lighting, either plain or decorated.

Special Designs Furnished

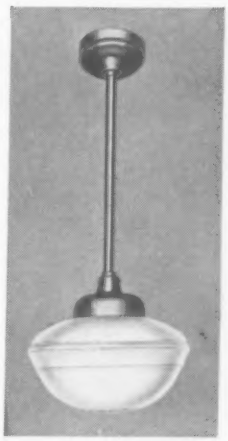
Although the designs shown on the page are all standard units, Graybar can supply specially planned fixtures for any lighting purpose to harmonize with the architectural surrounding of the building in which they are to be placed.

Outdoor Floodlighting Equipment

Graybar also has a complete choice of lighting equipment for ornamental lighting, floodlighting, athletic field lighting, etc.

Sunlamps

Graybar offers a variety of "Sunlite" lamps for gymnasium and classroom use. These lamps enjoy a very wide use in kindergarten rooms.



THE SHELCREST "33" GLOBE

SUNLITE NO. 12

DUO-PURPOSE SUNLITE NO 2121

FOR EVERYTHING ELECTRICAL NEEDED BY SCHOOLS AND COLLEGES

Whether your problem concerns lighting, communication systems or any other electrical equipment, it will pay you to consult Graybar for full information. Specialists at any one of 76 branch houses located in the principal cities of the country or at the general offices in the Graybar Building, New York City, will be glad to give you the benefit of their experience and Graybar's experience of 60 years in the electrical industry

INTERNATIONAL TIME RECORDING CO.

Division of International Business Machines Corporation

GENERAL OFFICES
270 Broadway
NEW YORK, N. Y.

CANADIAN DIVISION
International Business Mach. Co., Ltd.
300 Campbell Ave., Toronto, Ont.

Branch Offices and Service Stations in All the Following Cities

Akron, Ohio	Denver, Colo.	Minneapolis, Minn.	Rockford, Ill.
Albany, N. Y.	Des Moines, Iowa	Newark, N. J.	St. Louis, Mo.
Atlanta, Ga.	Detroit, Mich.	New Orleans, La.	Salt Lake City, Utah
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Binghamton, N. Y.	Grand Rapids, Mich.	Omaha, Neb.	San Francisco, Calif.
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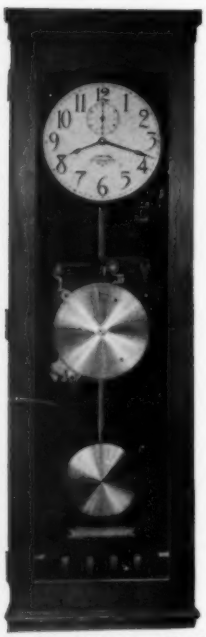
Cincinnati, Ohio	Kansas City, Mo.	Providence, R. I.	Toledo, Ohio
Cleveland, Ohio	Los Angeles, Calif.	Reading, Pa.	Tulsa, Okla
Columbus, Ohio	Louisville, Ky.	Richmond, Va.	Washington, D. C.
Dallas, Texas	Memphis, Tenn.	Roanoke, Va.	Wichita, Kans.
Dayton, Ohio	Milwaukee, Wis.	Rochester, N. Y.	Wheeling, W. Va.

Complete information regarding any one or all of the following International devices may be obtained by writing or 'phoning the nearest branch office

ELECTRIC TIME AND PROGRAM SYSTEMS



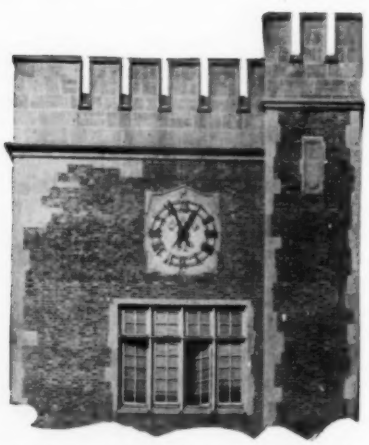
Combined Master Clock and Program Control Device. Program equipment also furnished in separate cabinet models.

Metal Case Secondary Clock for use in classrooms, etc. Other styles are available to meet any particular decorative or architectural scheme.

Marble Dial Secondary Clock. Suitable for Auditorium or Lobby. Other special models may be had for Gymnasiums, Libraries and Corridors.

Weight driven Master Clock with Mercurial Pendulum. Maintains constant accuracy of all clocks and bells.

Weatherproof Gong for outside use. Mechanism completely shielded against rain and snow.



Weatherproof Outside or Tower Clock. Many other models are available to meet individual requirements.

Metal Case Gong for classrooms or corridors. A wide variety of other types of signal equipment is available.

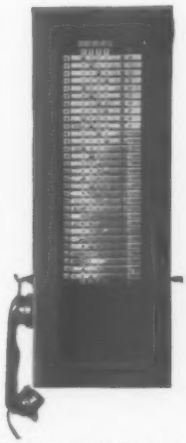
INTER-COMMUNICATING TELEPHONE EQUIPMENT

Principal's Desk Type Telephone Switchboard. For either fifty or one hundred line capacity.

Flush Wall Telephone for classroom use.

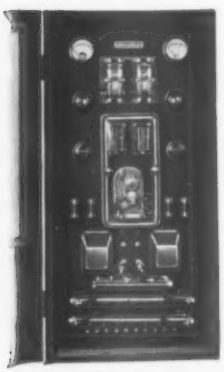
Pedestal Type Desk Telephone for general offices and classrooms.

Cradle Type Desk Telephone, for general office or classroom extensions.



Combined Telephone Control and Bell Control Board. Adaptable for small or medium-sized schools.

FIRE ALARM EQUIPMENT



Control Panel for Closed Circuit Fire Alarm System. Contains a Master Code Movement.

Non-Code Flush Break-Glass Station.

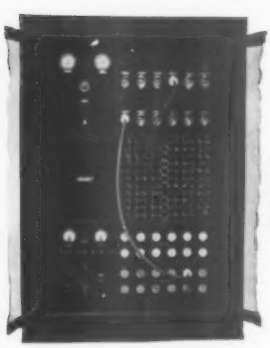
Flush Type Code Station.

Single Stroke Gong Alarm. Furnished in 6", 8" and 10" sizes.

Closed Circuit Fire Alarm Control for small or medium-sized schools where it is not necessary that each station transmit a separate code.

Non-Contact Type Fire Alarm Horn.

LABORATORY PANELS AND PUBLIC ADDRESS SYSTEMS



Laboratory Experimental Panel. The most flexible board on the market. Complete safety is guaranteed.

Classroom Loudspeaking Telephone. Of highest quality construction.

Principal's Desk Microphone for distribution of bulletins, radio programs and instruction.

THE JENNISON-WRIGHT COMPANY

Toledo, Ohio

Branches in All Large Cities

Kreolite Wood Block Floors serve in the school and educational institution no less than in the factory and work shop where today their use is so general as to reveal Kreolite as the national choice for heavy-duty service.

Especially is Kreolite specified for all departments where mechanical operations are carried on. Tools are not damaged when they are dropped, for the Kreolite floor is resilient. The floor is not damaged because wear and accident leave no appreciable impression upon the tough end grain surface of the specially treated selected wood blocks.

Among the scores of leading educational institutions now enjoying the economy and benefit of Kreolite Wood Block Floors are: Cleveland High School, Cleveland, Ohio; Jefferson High School, Los Angeles, Calif.; Lindbloom High School, Chicago, Ill.; University of Michigan, Ann Arbor, Mich.; Purdue University, Lafayette, Ind.; Technical School, Indianapolis, Ind.; University of Illinois, Urbana, Ill.; University of Wisconsin, Madison, Wisc.; Yale University, New Haven Conn.

Write for complete information.

The value of Kreolite Flexible Strip End-Grain Wood Block Flooring is recognized instantly by the modern architect of schools and public buildings. Among the big new schools in which this ultra-modern floor is being laid this month is the Junior-Senior High School in Charles City shown above. Only Kreolite is appropriate in such a building.

Kreolite Flexible Strip End-Grain Wood Blocks cannot become loose. The durability is practically limitless as the strips are laid with the tough end-grain of the individual blocks uppermost. The light, natural color and beauty of the wood is retained, although the blocks are treated with a water-proof preservative.

Complete information sent on request

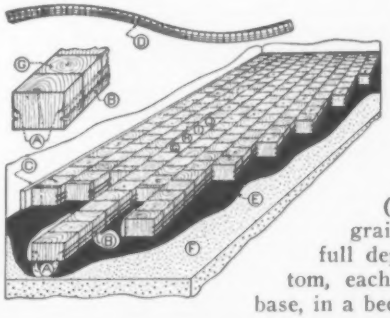
(a)—Metal sire truss binding the individual blocks into a compact, solid monolithic-like end-grain plank or strip.

(b)—Metal spline binding the individual strips together.

(c)—Cork expansion joint laid flush with the surface of the floor.

(d)—Flexibility—can be laid over wood sub-floor, in mill type buildings.

(e)—Waterproof membrane between concrete and strips.



(f)—Smooth finish concrete foundation.

(g)—Surface sanded smooth.

(h)—Manufactured from properly dried yellow pine or redwood.

(i)—Treated with a colorless, odorless, waterproofing preservative so that the natural light color of the wood is maintained.

(j)—Laid with the tough end-grain up. End-grain blocks run full depth of strips, from top to bottom, each block being anchored to the base, in a bed of mastic.

KREOLITE

FLEXIBLE STRIP WOOD BLOCK FLOORING

THE AMERICAN SCHOOL AND UNIVERSITY

KNAPP BROTHERS MANUFACTURING CO.

Designers — Manufacturers — Distributors

REPRESENTATIVES IN ALL THE PRINCIPAL CITIES

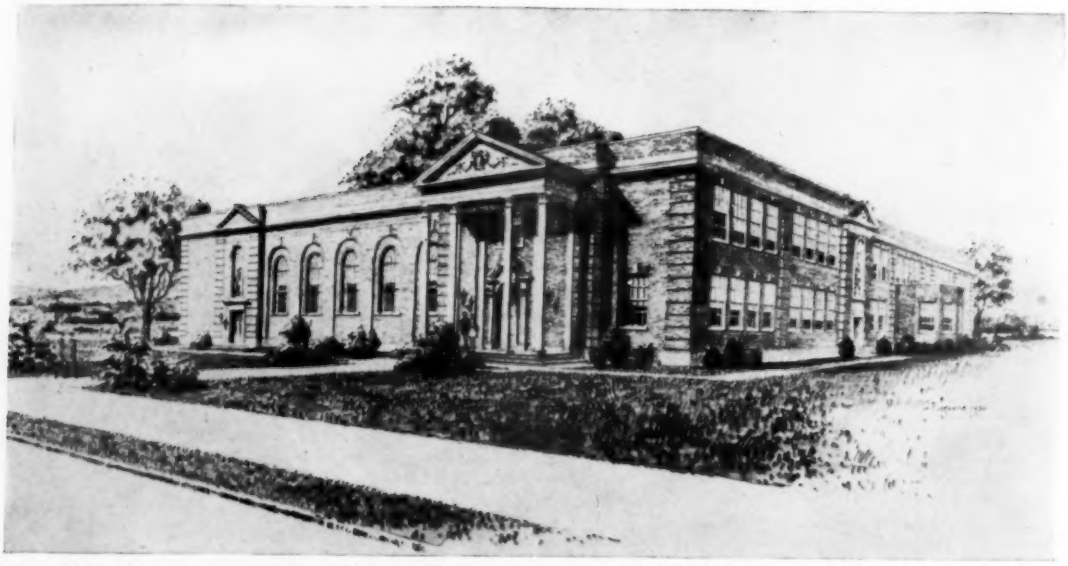
Main Office: CHICAGO, ILL.
605 W. Washington Blvd.

Knapp SANITARY METAL TRIM

Established 1905

The largest mnaufacturer of a complete line of metal trim, corner bead and metal Specialties. See our pages in Sweet's Catalog

METAL TRIM AND SPECIALTIES



Tooker & Marsh, Architects, New York City, and Milton Lee Crandall, Associate Architect, Glens Falls, N. Y.

In the **Broad St. Grade School,** Glens Falls, N. Y., the following Knapp products were used: No. 202, Six-Inch Metal Base; No. 76 Casing with No. 26 Mould; No. 43 Sanitary Cove; No. 600 reinforced Corner Bead, also Knapp Base Ground and Screed. The items were furnished in extra tight coat (hot process) galvanized steel with a factory coat of special gray paint which served as a ground priming coat for subsequent decoration on the job.

LIST OF SCHOOLS

For twenty-seven years we have supplied Knapp trim and Specialties for schools, academies, colleges, etc., throughout America. There are thousands of them. We will send a list of projects in every State in the Union and architects on request.

Our intimate knowledge of what is appropriate for schools is the automatic result of years of contact with architects, school superintendents and contractors. Our factory is modern, devoted exclusively to our business.

We are not a unit of a division of a consolidation selling everything from a ten-penny nail to a steel girder. We devote our experience and energy to a specialized business.

27 YEARS OF SERVICE

Knapp products have stood the test of time. After twenty years there is no sign of corrosion. **For a nominal cost** the stool, base, casings, etc., may be repainted to conform to the general scheme of decoration and are as good as new.

While Knapp trim was satisfactory twenty years ago and is still in service, we have progressed with experience. Present-day designs, new methods of installation and capable workmanship on the part of contractors provide metal interior trim that is attractive, economical and utilitarian.

We can interpret your needs and provide real service.

Five School Fires per Day!

"Is your school a fire-trap?" asks the Ladies' Home Journal, May 1932 issue. The National Board of Underwriters say there are five school fires every day in America. The so-called fire-proof building has the least amount of inflammable materials in its construction.

Why the Effort of Teachers to Create Atmosphere in the Schoolroom?

Certain expensive kinds of interior trim that crack, pit and take stains can never be satisfactorily redecorated or repaired. A teacher or child may spend many years in the same room or building. At nominal cost "Knapp" trim may be redecorated to harmonize with any new general scheme of decoration.

Interior trim is a small item in the cost of the building. Cheap casings, stools and blackboards are ideal breeding places for mice, cockroaches, termites, etc. "Knapp" plastered in trim does not shrink or crack. Considering savings in labor and installation it is economical.

What Do We Make?

Window and Door trim, frames, baseboards, cove mouldings, radiator recess, window stools, casings, chair rail, blackboard trim and chalk trough, picture mould, croner bead, grounds, screeds, etc.

Knapp Metal Trim

is artistic in design and finish; is fire-proof; is vermin proof; is easily cleaned, and is enduring.

Knapp Metal Trim

does not crack, shrink, pit, nor rot.

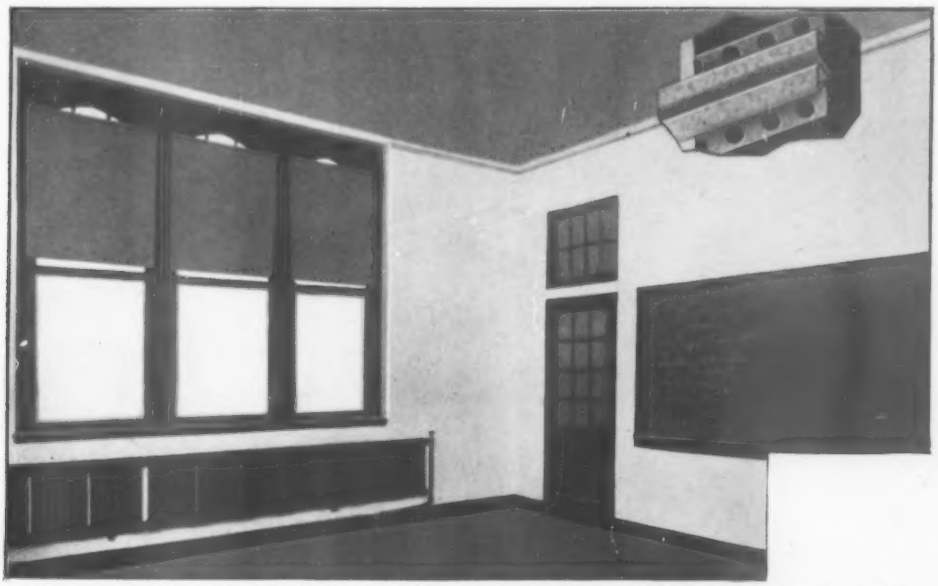
Knapp Metal Trim

is not cold or hard in appearance. It is not tinny. If stained or worn it may be redecorated at nominal cost. We recognize the fact that metal is not adapted to any and all conditions. We only advocate its use where years of experience have proven its superior value over other materials.

"Keep the Corners Clean"

Notice this close-up view of **Knapp** Sanitary Metal Window Trim. Isn't it neat and clean-cut in appearance? Requires only 15 to 20 minutes to erect, and is easy to get at and keep wholesome and clean.

May we send a Catalog to you?



Schoolroom equipped with **Knapp** No. 20 Picture Mould, **Knapp** Metal Base, Window Stool, Door Casing, Transom Casing, Chalk Trough, Blackboard Mould, and Bull Nose Corner Bead on Window Jamb.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

Branch Offices or Distributors in All Principal Cities

MAIN OFFICE
Minneapolis, Minn.

PRODUCTS

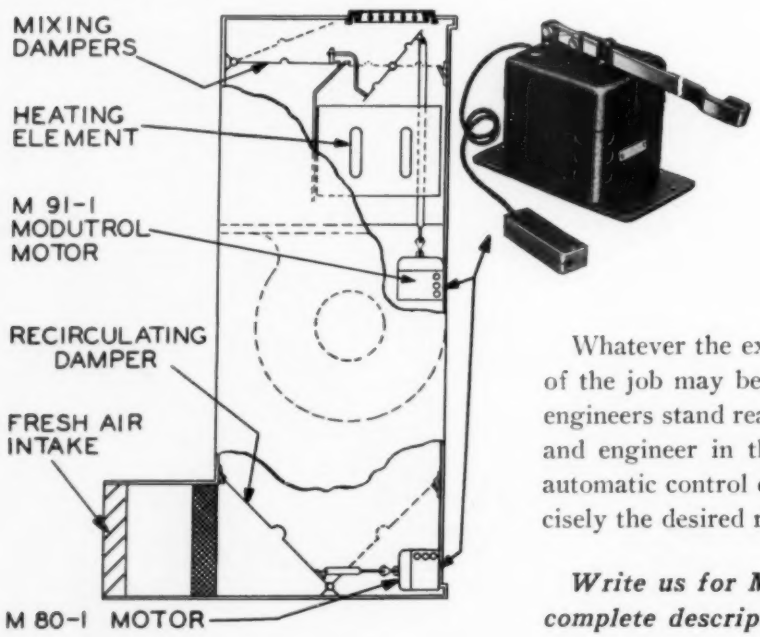
Modutrol system for the electrical modulating of mixing dampers in air conditioning and heating-ventilating units; the **Modustat,** a self-contained automatic temperature control valve for individual radiators; and **Zone Control** systems, which are greatly needed not only in all fairly large-sized school buildings but also on campuses where several buildings are heated from one central heating plant.

THE MODUTROL SYSTEM

A complete line of modulating controls for air conditioning and heating-ventilating equipment for school and college buildings.

The Minneapolis-Honeywell Modutrol System provides true electrical modulation of mixing dampers and fresh-air louvers, operating in harmony with Modustat control of the heating element. Each unit operates independently of all other units of the ventilating heating system. The Modutrol System requires no compressed air lines or compressor, so can be readily and economically installed in small as well as large buildings, and in old as well as new.

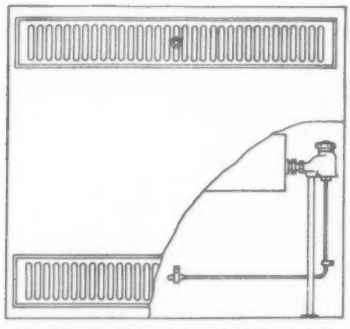
From the complete Modutrol System the heating engineer chooses the right controls to meet the specific requirements of each installation. Modutrol Thermostats, Aquastats, Pressurestats and Duct Thermostats are available to cover a wide field of application in space heating-ventilating, air conditioning and industrial process control, where true modulation, accuracy, dependability and minimum upkeep are desirable.



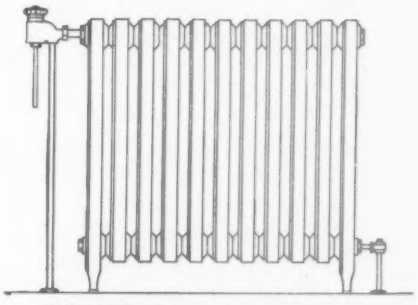
UNIT VENTILATOR INSTALLATION USING THE MODUTROL

Whatever the exact control requirements of the job may be, Minneapolis-Honeywell engineers stand ready to assist the architect and engineer in the proper application of automatic control equipment to deliver precisely the desired results.

Write us for Modutrol specifications, complete description and illustrations.



MODUSTAT INSTALLATION ON CONCEALED TYPE RADIATOR



MODUSTAT INSTALLATION ON EXPOSED TYPE RADIATOR

THE MODUSTAT

A self-contained automatic room temperature control valve for individual radiators.

It is obvious that rooms on the cold side of a school building require more steam to maintain even, comfortable temperatures than rooms that are exposed to the direct rays of the sun or are sheltered from chilling winds. Because such factors as wind direction, wind velocity, solar radiation, number of people in a room, etc., vary greatly from time to time, it is impossible in advance to calculate how much steam should be delivered to a room to keep it uniformly warm at all times. The amount of steam admitted to the radiator must be continually altered to keep the room temperature steady. The size of the radiator orifice is reduced or enlarged in accordance with the temperature requirements of the particular room in which the radiator is located. Accurate room temperature is maintained regardless of the temperature requirements of other rooms in the building.

TYPE V56-2 MODUSTAT For indirect or Cabinet Radiation. Key-set Adjustment

TYPE V55-1 MODUSTAT For Exposed Radiators. Hand Wheel Adjustment. (Shown below)

That is exactly what the Minneapolis-Honeywell Modustat does automatically.

The Modustat is finely finished, compact and inconspicuous. It is as easily installed as an ordinary hand valve on all types of 2-pipe steam, vapor or vapor-vacuum systems.

Two types of the Modustat are offered—Type V-55 for direct (exposed cast iron) radiation, and Type V-56 (illustrated on this page) for concealed (cabinet or indirect) radiation.

Write for complete description of each type.

ZONE CONTROL SYSTEMS

For large school buildings and for campuses where several buildings are heated from one central heating plant.

In order to eliminate extreme variations of temperature throughout a large school building, or throughout the several buildings on a campus, the Minneapolis-Honeywell Zone or Sectional Control System is advocated. Zone or sectional control may be subject to the command of a plain thermostat which operates at a temperature that is variable by hand setting, or it may be subject to the command of a clock thermostat which will operate at a predetermined temperature for a specified period, at the termination of which the temperature is either raised or lowered automatically to some other predetermined point. The exclusive Minneapolis-Honeywell Zone Control combines clock control with steam flow control, resulting in a remarkable uniformity of temperature throughout all campus buildings or all parts of the same large building.

Let us send you further details. Or, better, get in touch with the trained Minneapolis-Honeywell temperature and ventilating control engineer who is near you.

PITTSBURGH REFLECTOR COMPANY

Manufacturers of "Permaflectors" for Practically Every the Silver-Plated Glass Reflectors School Lighting Need

Sales Offices in Principal Cities

Executive Offices
Pittsburgh, Pa.

PERMAFLECTOR LIGHTING FOR SCHOOLS AND COLLEGES

Permaflector Lighting is engineered lighting, carefully planned and designed for the particular purpose for which it is intended.

The Permaflector line is a complete one, comprising more than 70 different designs of silver-plated glass reflectors, each one of which is particularly adapted to a specific lighting application.

After more than twenty years' experience in practically all phases of illumination, the Permaflector Engineering Department has accumulated a comprehensive knowledge of illumination problems, which enables them to be of considerable assistance to anyone desiring such information.

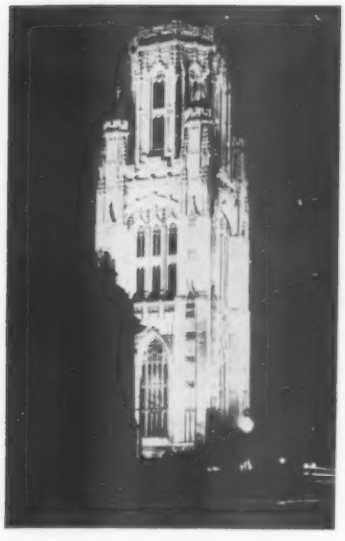
Architects, builders and school authorities are invited to consult our Engineering Department in regard to lighting of class rooms, auditoriums, libraries, gymnasiums, art galleries, laboratories, lecture halls, exterior floodlighting of buildings and recreational areas—in fact, any lighting problem in connection with an educational institution.

CLASS ROOMS

Permaflector Luminaires are ideal lighting units for class rooms, study halls, libraries, offices, etc. Many types of Permaflectors readily adapt themselves to special designs of fixtures, cove and urn lighting.

GYMNASIUMS

For the lighting of gymnasiums, field houses, indoor athletic pavilions, Permaflectors may be mounted flush with the ceiling, as shown above, or suspended from the ceiling, with equally efficient results.



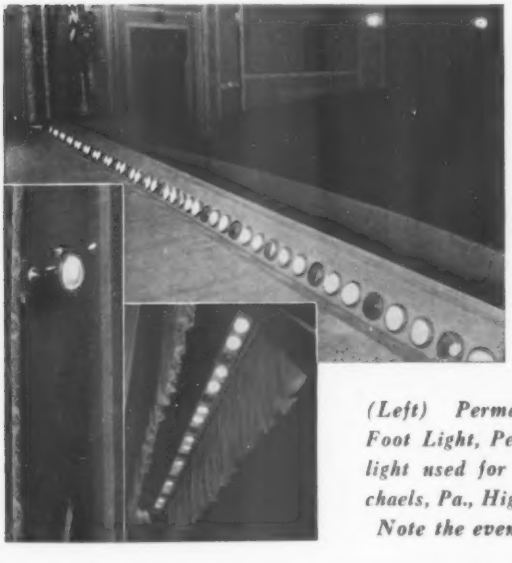
FLOODLIGHTING

Permaflector Floodlights find many applications in modern school activities. Bristol University, Bristol, England (left) and Westminster College, New Wilmington, Pa. (right) employ floodlighting not only as a medium of advertising, but to implant a bit of pride in the hearts of students and residents of the community.

Write for a copy of Permaflector Lighting Catalog which illustrates and describes the complete Permaflector line of silver-plated glass reflectors. This book contains much valuable information regarding general lighting practice, with engineering data and diagrams, for your guidance in planning proper lighting installations.

We also have available a booklet dealing with the specific lighting problems of a school or university, which is free for the asking to anyone interested in the subject. Ask for *Permaflector Lighting, School & College Number.*

AUDITORIUM AND STAGE



(Left) Permaflector Lighting for stages, showing Permaflector Foot Light, Permaflector Border Light and a Permaflector Floodlight used for emergency light. (Right) Auditorium at Carmichaels, Pa., High School, lighted in color by Permaflectors in coves. Note the even distribution of soft yet high intensity illumination.

SEDGWICK MACHINE WORKS

Manufacturers of Hand Power and Electric Dumb Waiters and Elevators

TELEPHONE
WAtkins 9-4034

141 West 15th Street
New York, N. Y.

FACTORY
POUGHKEEPSIE, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

PRODUCTS

Hand Power Dumb Waiters and Elevators of all types and for every purpose; Electric Dumb Waiters and Sidewalk Elevators; Book Lifts; Freight Elevators; Trunk Lifts; Laundry Lifts; Ash Hoists. Special outfits designed to meet special conditions or requirements.

CONSULTATION SERVICE

An experienced staff of engineers is maintained to cooperate with you in the selection of suitable type of outfit to meet your requirements. Not even the most expensive equipment will give satisfaction unless it is specifically adapted to individual requirements and properly installed. Sedgwick Architectural and Engineering Service places at the disposal of schools, without charge, the benefit of specialized experience of nearly half a century.

INSTALLATION

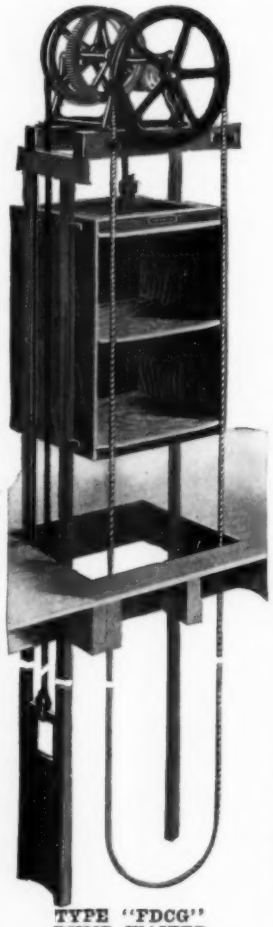
Proper installation is essential to satisfactory operation. Blueprints and full directions for installing are furnished with each outfit, from which local labor can install. Or, we send our own experienced mechanics on request. Customers will always secure better results by purchasing complete outfits rather than by securing part of the equipment from local sources.

SEDGWICK DUMB WAITERS IN THE SCHOOL

Because of their economy and long proved dependability, Sedgwick Dumb Waiters have been installed in schools and colleges throughout the world and are giving efficient and reliable service year after year, lifting or lowering books, food, stationery supplies and countless other school loads.

When construction or conditions of the school building will not permit the location of kitchen and cafeteria on the same floor, without using space more valuable for other purposes, it is often advantageous to locate the kitchen on another floor, and by installation of suitable dumb waiter equipment, service between floors is economically and satisfactorily handled. Or, if it is desirable to utilize basement space for storage of supplies, distribution to all floors can be easily and quickly accomplished by dumb waiter transportation.

SEDGWICK
Dumb Waiters - Elevators
FOR ALL PURPOSES



TYPE "FDCG" DUMB WAITER

All metal equipment — Sedgwick Dumb Waiters and Elevators, electric and hand power, can be supplied with steel or other metal cars, and with metal guide runs as desired.

TYPE "FDCG" GEARED AUTOMATIC BRAKE DUMB WAITER

This Dumb Waiter has been specially designed for service where average loads do not exceed 75 pounds, but where capacity or test loads up to 200 pounds may be carried.

The Sedgwick Automatic Brake assures safety in operation, the car being automatically held at any point in the shaft as soon as operator stops pulling the hand rope. Anti-friction steel roller-bearings increase ease of operation, and machine cut spur gears eliminate unevenness in performance.

"SEDG-VERSAL" COMPOUND GEARED DUMB WAITER

This Dumb Waiter is especially designed for average loads up to 150 pounds and capacity loads of 400 pounds, or where requirements cannot be determined in advance. Machine is provided with two sets of machine cut spur gears, two full diameter hoist wheels, anti-friction steel roller bearings, and band brake or automatic brake as conditions demand, all contained in substantial iron frames as a complete unit. By rearrangement of gears and mechanism it is adaptable to universal conditions, embodying the capacity features of five types of dumb waiters.

This outfit is recommended for the handling of book buses, food supplies in bulk, and other heavy loads within its capacity.

SEDGWICK UNIVERSAL ELECTRIC DUMB WAITERS

The machine used to furnish the motive power for the Sedgwick Universal Electric Dumb Waiter is made in 5 standard series, each for a definite load capacity, thus assuring lowest possible current consumption. The machine is designed throughout for the special requirements of dumb waiter use and may be installed either at the top or foot of shaft.

This dumb waiter is smooth and quiet in operation, with adequate speed and dependable safety. All parts are ruggedly constructed for long service.

Complete equipment includes machine with motor and brake, idler wheels, shafts and bearings; call and send push button controls; car; counterweight; cables and connections; guide runs.

DUMB WAITER DATA

Answers to the following questions will ordinarily enable us to make recommendations intelligently:

(1) What is the outfit to be used for?
(2) How large a car is desired?
(3) How far does the car travel?
(4) Have you a place prepared for the outfit?
(5) What will be the weight of average loads?
(6) What will be the weight of heaviest loads?
(7) Are loads all up, all down, or both up and down?
(8) Who will operate: men, women, boys or girls?
(9) Are all doors located in the same front?

SEDGWICK BOOK LIFTS

School and University Libraries have found Sedgwick Dumb Waiters valuable labor-saving equipment when used as Book Lifts. The regular construction is used where enclosures are necessary. Brass and steel tube dumb waiters are selected where open construction is preferred. Consultation is advised in order to secure equipment which will be completely satisfactory. Sedgwick Book Lifts are built in all capacities and types suitable for every requirement. Specify load to be carried, normal and maximum, and size of car required.

SEDGWICK ELEVATORS IN THE SCHOOLS

Service requirements in schools, colleges and similar institutions frequently call for equipment designed to carry loads greater than those within the capacity of Sedgwick Dumb Waiters. For such needs we recommend Sedgwick Hand Power Freight Elevators. These elevators embody every known improvement for safe, easy and economical operation, having an iron-frame machine fitted with steel brace rods and steel shafting, spur gears, hoist wheels and band brake, all a self-contained unit. The spur gears are of ample size and strength and all shafts revolve in steel anti-friction roller bearings.

The Sedgwick Band Brake and "Automatic Locking Device" permit perfect control by means of a brake rope which is applied by the operator. The band brake is adjustable for wear and practically indestructible. The car is carried by two standard hoisting cables, independently attached to car and counterweight, each of ample strength to sustain the car with capacity load if used alone, and each acting as a safety for the other.

TRUNK LIFTS

Sedgwick Trunk Lifts are easy-running freight-type elevators with platform slatted on sides and back, and are particularly suited to load handling requirements in dormitories. These Lifts are usually made four feet square to carry furniture, trunks, supply carts and other bulky articles from one floor to another. However, they can be furnished in special sizes to meet special conditions.

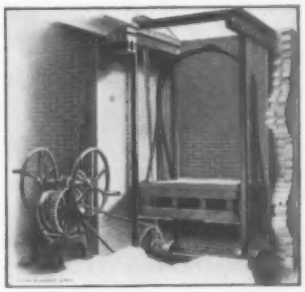
TRUNK LIFT

LAUNDRY LIFTS

Sedgwick Freight Elevators as well as Sedgwick Dumb Waiters, according to the capacity required, make exceptionally serviceable Laundry Lifts.

SEDGWICK SIDEWALK ELEVATORS

Supplies can be lowered from the sidewalk, or waste material, ashes and other loads carried from the basement by the use of Sedgwick Sidewalk Elevators operated by hand or electric power. Where constant service is not required, the Sedgwick Hand Power Sidewalk Elevator is particularly suited because of its low installation cost and practically no maintenance expense.



SIDEWALK ELEVATOR

Special study should be made of the local regulation regarding the installation of sidewalk elevators, as regulations vary in different localities. Our Service Department will gladly submit complete recommendations.

ASH HOISTS

The Sedgwick Ash Crane is a simple, convenient device for hoisting cans of ashes. When not in use the Crane is dropped below sidewalk level. When raised, the Crane may be swung to any position required, permitting cans to be raised without coming in contact with surrounding walls; and when cans are above the sidewalk level, the Crane may be swung around so as to deposit the load upon the sidewalk.

TYPES AND USES OF SEDGWICK EQUIPMENT IN SCHOOLS AND UNIVERSITIES

Kind of Load	Average Weight	Capacity	Type	Convenient Size, Wdth. Dpth.	Space Required, Wdth. Dpth.
Books, stationery, food supplies, laundry ...	up to 75 lbs.	250 lbs.	"FDCG" or Electric D. W.	32" x 28"	37" x 31"
Food or book buses and supplies in bulk	up to 150 lbs.	500 lbs.	"Sedg-Versal" or Electric D. W.	28" x 36"	34½" x 39"
Basement - to - sidewalk, supplies, equipment, ashes	up to 500 lbs.	1500 lbs.	Sidewalk Elevator	48" x 48"	62" x 50"
Furniture, trucks, laundry hampers, supplies	up to 300 lbs.	1000 lbs.	Trunk Lift	48" x 48"	57¼" x 52"
Occasional ash cans ...	15 lbs.	25 lbs.	Ash Crane		36" x 36"

SPEAKMAN COMPANY

Wilmington, Delaware

The Speakman Company makes a complete line of showers and shower heads designed especially for schools, colleges, universities and institutions. In designing this equipment consideration has been given to water economy as well as cost of upkeep.

K-3395 — SPEAKMAN Anystream Self-Cleaning Shower Head (Pat. Jan. 2, 1923 and Nov. 3, 1931)

Ball joint not furnished unless specified

FLOOD SHOWER

NORMAL SHOWER

NEEDLE SHOWER

Any volume or force from a flood shower to a needle bath now possible by setting the plungers in this new kind of a shower head

There has possibly been no development in the shower field within the past several years which compares with the Speakman Anystream Self-Cleaning Head. This head, **which can never stop up,** gives a new convenience and satisfaction to shower bathing, because the bather can change from a needle, normal, or flood shower instantly, when the lever handle type head (K-3395) is used.

Other types shown are key and screwdriver-operated (K-3396 and K-3397). These are designed to be flushed at regular intervals by an attendant.

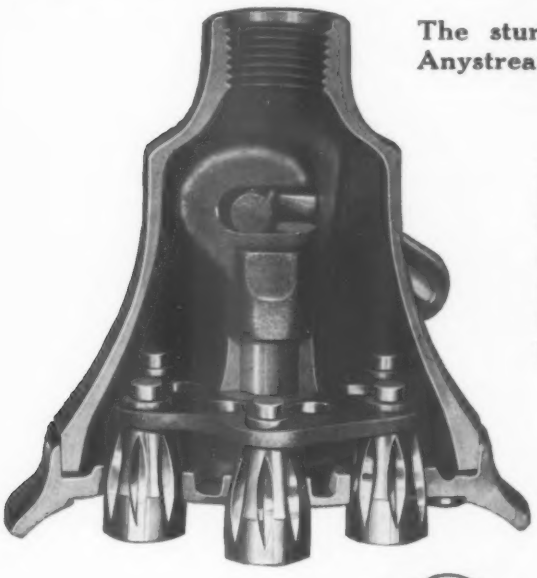
Wall type heads (K-3399) which fit flat against the wall, also are shown. Such heads are coming into general use in schools, colleges, institutions, because they are abuse-proof and cannot be removed by mischief-bent persons. Also, for school and institution use, the Anystream Self-Cleaning Head (K-3395) is supplied with an extremely short arm, which cannot be used as a trapeze.

K-3399 — SPEAKMAN Anystream Self-Cleaning Wall Type Shower Head, with ½-inch I. P. female inlet in center of back and arranged to operate by a 5/16-inch hexagon wrench which is furnished

K-3396—SPEAKMAN Anystream Self-Cleaning Shower Head with ½-inch I. P. female inlet and lock-shield arranged to operate by a key

K-3397—SPEAKMAN Anystream Self-Cleaning Shower Head with ½-inch I. P. female inlet and arranged to be operated with a screwdriver

WE ALSO MANUFACTURE ALL TYPES OF BATH AND LAVATORY FIXTURES



The sturdy construction of all Speakman Anystream self-cleaning shower heads is illustrated at the left

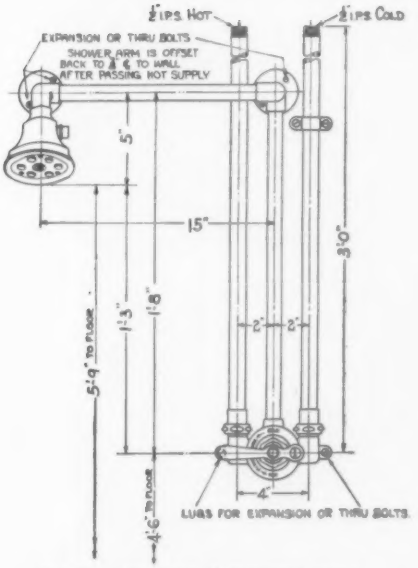
The heavy spindle shown in the open yoke has an eccentric motion which, as the handle is turned, pushes or pulls the plate to which the plungers are attached, thus reducing or enlarging the size of the openings through which the water passes. The face of the head is held in place securely by three heavy set screws.

K-3398—SPEAKMAN Anystream Self-Cleaning Shower Head with short flanged arm having ½-inch I. P. female inlet. Arm can also be furnished with large flange drilled for two screws or bolts

This 16-page bulletin should be in the hands of every one interested in any way in school showers

Shown at the right is layout of one of newly designed Speakman school showers

The piping in these showers is so close to the wall that it is impossible to get the fingers behind them. Several types of Speakman School Showers are illustrated in our new 16-page bulletin, which will be sent to school boards, superintendents of schools, architects—any one interested in the use, installation, and upkeep of showers. In it is authoritative information on showers and shower heads not available in any other place, complete with roughing-in.



K-3110—Exposed Mixometer Type, designed for institutions

THE AMERICAN SCHOOL AND UNIVERSITY

THE STANDARD ELECTRIC TIME COMPANY

Springfield, Mass.

ATLANTA, William-Oliver Bldg.
BALTIMORE, Baltimore Trust Bldg.
BIRMINGHAM, 2920—7th Ave., So.
BOSTON, 10 High St.
BUFFALO, 220 Delaware Ave.
CHICAGO—Monadnock Bldg.
CLEVELAND—Union Trust Bldg.
COLUMBUS—83 South High St.
DALLAS, Mercantile Bldg.
DENVER, 562 Pennsylvania St.
DETROIT, Donovan Bldg.
KANSAS CITY, MO., Mutual Bldg.
MINNEAPOLIS, McKnight Bldg.
NEW YORK CITY, 50 Church St.
PHILADELPHIA, 1612 Market St.
PITTSBURGH, Bessemer Bldg.
SCRANTON, 148 Adams Ave.
TAMPA, 5505 Central Ave.

The Standard Electric Time Co. of California
950 Parker St., Berkeley
LOS ANGELES, 124 West 4th St.
PORTLAND, 65—1st St.
SEATTLE, 1714 1st Ave., So.
SPOKANE, 110 S. Cedar St.

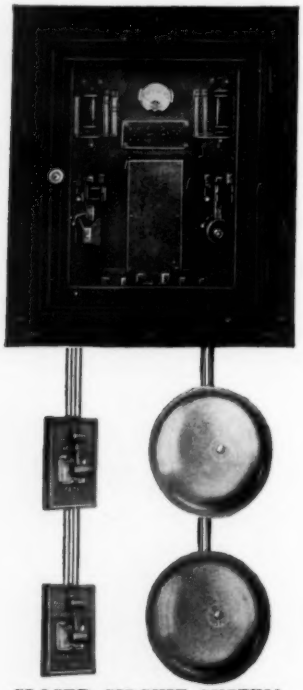
The Standard Electric Time Company of Can., Ltd.
726 St. Felix St., Montreal, Que.
57 Bloor St. W., Toronto, Ont.

"STANDARD" Fire Alarm Systems

(Approved by Underwriters)

1. **Maximum Protection to Life and Property**
2. **Thorough Reliability**
3. **Simplicity**
4. **Economy in Operation and Maintenance Cost**

These are the qualifications which have made "Standard" fire alarm systems so successful everywhere and the choice of prominent architects, engineers and school officials.



CLOSED CIRCUIT SYSTEM

Closed Circuit Supervised Fire Alarm System

These systems are furnished to operate from either A.C. or D.C.; are single or double supervised as required. Fire signals are sounded on gongs or horns as desired, and sent from break-glass stations conveniently located throughout the building.

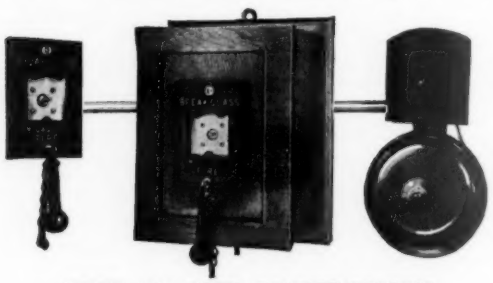
This system is as near fool proof as a fire alarm system can possibly be made,—the last word in school fire alarm equipment.

Station Coded System

These systems provide double code stations ringing distinctive signals from each box indicating location of fire and permitting safe exit.

Open Circuit System

In cases where our open circuit system is desired without the electrical supervision,



(TYPE 450) OPEN CIRCUIT SYSTEM

Type 450 is recommended. This operates similar to the closed circuit FBS system except for its open circuit and non-supervision features. Vibrating gongs are recommended as preferable with this type.

Write for Bulletins

See page 372 for laboratory equipment.

ELECTRIC TIME AND PROGRAM EQUIPMENT

FIG. 116
SQUARE WOOD CASE SECONDARY CLOCK

Standard Electric Time products are the result of nearly half a century's experience in the manufacture and installation of school equipment. They are manufactured of the best materials obtainable, by skilled labor, under expert supervision, and are engineered and installed under a system which insures absolute satisfaction to the owner.

The "Standard" line of electric time equipment now comprises two distinct systems both of the minute impulse type. One is operated from battery—preferably storage battery type—the other the A.C. Constant Service type which operates from the A.C. lighting service with reserve power unit which functions instantaneously and automatically in case of current failure.

The "Standard" program clock is completely automatic, ringing the bells on predetermined schedule with automatic silencing feature. Belis and yard gongs are furnished in various styles and sizes.

FIG. 803
PROGRAM BELL

Standard secondary clocks are furnished in wide variety of design with wood or metal cases also special marble or metal dials according to requirements.

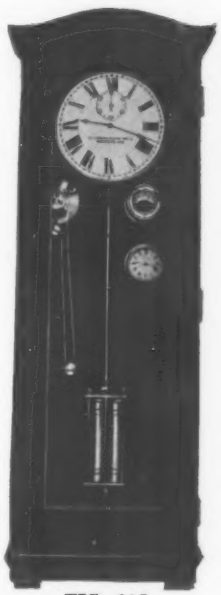


FIG. 105
MASTER CLOCK
60-BEAT MERCURIAL PENDULUM

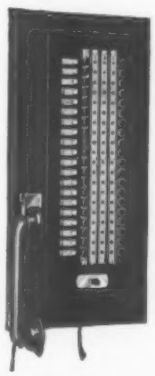


FIG. 818
COMBINATION BELL CONTROL BOARD AND CENTRAL TELEPHONE STATION

Standard Electric Time Equipment has been the predominant choice of school boards and architects for many years, owing to its superior excellence and unquestioned reliability. "Standard" manufactures and furnishes all types of program bells.

FIG. 118
ROUND METAL CASE SECONDARY CLOCK

School Telephone System

The "Standard" School Telephone system is combined with the bell control board and furnishes a selective ringing, common talking system of the utmost simplicity and reliability operating from the same current supply.

See page 372 for description of "Standard" laboratory systems.

Complete specifications, estimates and other data will be gladly furnished architects or other school officials upon request. Write Home Office or nearest branch.

FIG. 819
WALL TELEPHONE WITH WATCH-CASE RECEIVER

WESTINGHOUSE ELECTRIC AND MFG. CO.

EAST PITTSBURGH, PENNA.

Sales Offices and Locations in more than 110 Cities throughout the United States

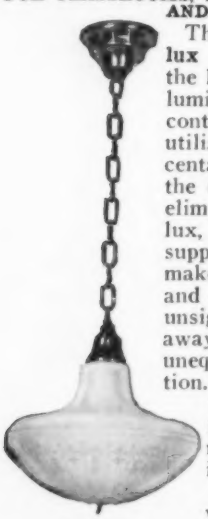
For Commercial Cooking Equipment, See Pages 307-309
For Athletic Field and Swimming Pool Lighting, See Page 205

INTERIOR LIGHTING EQUIPMENT

The Westinghouse Electric and Manufacturing Company manufactures lighting equipment suitable for providing the proper distribution of light, free of glare and objectionable shadows, in any installation that is required in the educational institutions. In classrooms, laboratories, shops, offices, libraries and dormitory rooms, correct lighting should be provided.

CEILING TYPE SOLLAIRE WITH PLAIN SAFETY HANGER AND DECORATED GLOBE (DRILLED) AND TASSEL

FOR CLASSROOMS, LIBRARIES, OFFICES AND DORMITORIES



CHAIN SUSPENSION TYPE SOLLUX WITH PANELED HANGER AND DECORATED GLOBE

The Westinghouse **Sollux** Luminaire provides the highest quality of illumination. The globe contour of the Sollux utilizes the highest percentage of the light generated and the diffusing quality of the glass eliminates all glare. In the Sollux, the keeper ring method of supporting the globe in the hanger makes the globe totally enclosed and dustproof. It also eliminates unsightly set-screws and does away with globe breakage due to unequal expansion and contraction. The tilt-out cap, another feature, permits easy replacement of the lamp without removing the globe from its holder.

Sollux is available with ornamental, paneled and plain hangers in both ceiling, chain suspension and semi-rigid types. Globes are plain and decorated, in sizes from 10 to 18 inches to accommodate lamps from 75 to 500 watts.

The **Lunalux** is a new development which embodies the desirable features found in the Sollux globe and produces indirect illumination from homogeneous glass. The newly developed process of making this type of semi-indirect unit creates a white reflecting surface on the inside of the lower part of the globe and leaves the upper part a light density having high transmission qualities with only slight diffusion. The result produces the pleasing, restful illumination of semi-indirect lighting without resorting to coating or enamel which may deteriorate with use.

Lunalux is available with paneled hangers for ceiling, chain and semi-rigid suspension. Globes are plain and decorated in sizes from 10 to 18 inches to accommodate lamps from 75 to 500 watts.

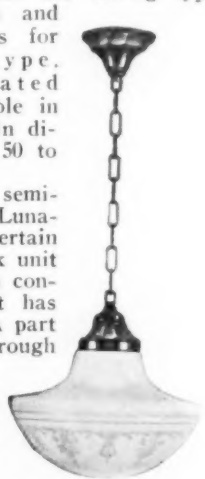
SEMI-RIGID SUSPENSION TYPE LUNALUX WITH PANELED HANGER AND PLAIN GLOBE

The Westinghouse **Sollaire** has practically the same efficiency of light distribution as the Sollux which it resembles greatly in appearance.

Certain Sollux features have been eliminated in the Sollaire and a considerable reduction in cost has thus been made possible.

The Sollaire comes with plain and paneled hangers for the ceiling type and with chain and semi-rigid hangers for the suspension type. Plain and decorated globes are available in sizes from 8 to 20 inches in diameter for lamps of from 50 to 1000 watts.

The **Lunaire** is another semi-indirect unit similar to the Lunalux. Like the Sollaire, certain features found in the Sollux unit have been eliminated and a considerable reduction in cost has thus been made possible. A part of the light is diffused through the lower part of the globe while the slightly diffused upper portion allows a greater part of the light to reach the ceiling to provide a soft, restful indirect illumination on the tops of desks and tables. All of this has been accomplished without the use of shields, masks, enamel or coating on the globe.



CHAIN SUSPENSION TYPE LUNAIRE WITH EMBOSSED BRONZE SAFETY HANGER AND DECORATED GLOBE

Lunaire is available with paneled hangers for ceiling, chain and semi-rigid suspension. Globes are plain and decorated in sizes from 8 to 20 inches to accommodate lamps from 50 to 1000 watts.

The Westinghouse **Sollite** offers a more angular globe for those to whom the Sollux and Sollaire globes do not appeal or who wish to use a globe with decoration in the more modern style. The Sollite comes in the plain, banded and **art moderne** styles. The diffusing glass used in the globe is of the same efficiency and quality as that used in Sollux and Sollaire Luminaires.

CEILING TYPE SOLLITE

The simplified mechanical construction of the Sollite allows it to be offered at a lower price and the improved globe holder furnishes a quicker means of attaching and removing the globe.

The Sollite is available in ceiling and suspension types with globes from 8 to 20 inches in diameter for lamps of from 50 to 1000 watts capacity.

Listed in the Commercial Lighting Catalog 219-B.

FOR LABORATORIES AND SHOPS

For foundry, laboratories and similar installations in engineering schools, Westinghouse improved vapor-proof units are suitable. They consist of cast-iron hoods, housing front-connected sockets, vapor-proof glass globes and suitable reflectors. They are easy to install and assure an installation that is positively unaffected by vapor and corrosive fumes.

VAPOR-PROOF UNIT WITH GLOBE GUARD FOR CONDUIT

GLASSTEEL DIFFUSER

For general lighting in manual-training shops, gymnasiums, pools, and similar installations, the Westinghouse line of Glassteel Diffusers and industrial reflectors assure a most satisfactory lighting installation.

Glassteel diffusers absolutely eliminate glare under all conditions.

Deep bowl reflectors provide an intensified light upon the part of the working plane beneath it and for that reason are ideal fixtures for places where the requirements are such that strong local lighting must be provided.

Listed in Industrial Lighting Catalog 219-A.

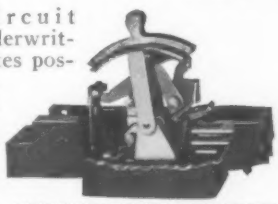
THE ILLUMINATING ENGINEERING BUREAU

Westinghouse maintains this Bureau to give advice and help in planning correct lighting, yours for the asking. Requests can be made at any Westinghouse Agent-Jobber or District Office.

DEEP BOWL FIXTURE

For Commercial Cooking, see pages 307-309.

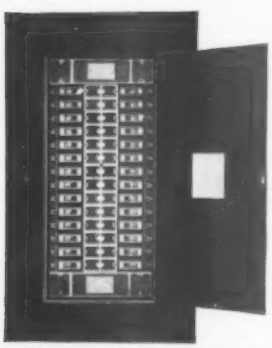
FUSELESS PROTECTION



"DE-ION" BREAKER UNIT

The "De-ion" circuit breaker unit has Underwriter's approval and makes possible fuseless circuits of 15 to 225 amperes 125, 250, or 600 volts for buildings. The 600-ampere size will be available later in the year. This unit with modifications is used in meter Entrance Breakers, Nofuze Panelboards, Nofuze Power Distribution Panelboard, on switchboards, in a cabinet as a safety switch; instead of switches and fuses. Thus it is possible to have complete fuseless protection from point of entry to final location.

Convenient, safe and tamper-proof, no fuses to replace, tripped breaker quickly detected because of handle position, and easily reclosed, are important advantages. Additional advantages are:



NOFUZE PANELBOARD

1. Can be reclosed by anyone as easily as a switch. Safe, nothing to replace or to renew.
2. Time lag prevents unnecessary tripping on slight, momentary overloads.
3. Cannot be held closed against an abnormal overload or short circuit.
4. Cannot be blocked to prevent its opening the circuit.
5. Rating cannot be changed by unauthorized persons.
6. Requires small mounting space.
7. Opens a short circuit without undue flash or noise.
8. No live parts accessible.

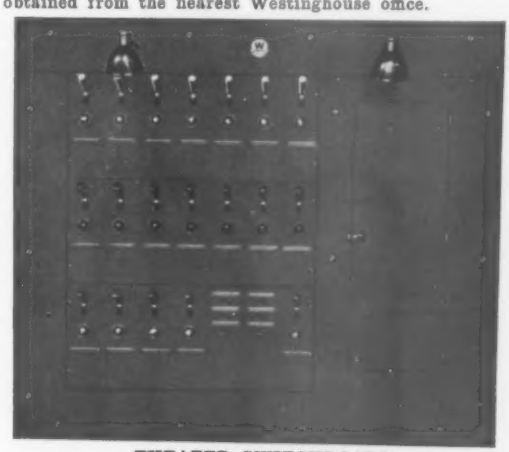
PANELBOARDS

Westinghouse manufactures a complete line of panelboards to meet all lighting control applications. Type NAB Nofuz lighting and distribution panelboards are equipped with "De-ion" circuit-breakers in place of the conventional switches and fuses.

THEATER SWITCHBOARDS

Westinghouse builds seven types of theater switchboards to meet the varied needs for control of colored lighting effects. Light, properly controlled, can add much to the effectiveness of the play or act. The audience, under the influence of colored light, unconsciously absorbs the spirit behind the production.

Complete information on theater switchboards can be obtained from the nearest Westinghouse office.



THEATER SWITCHBOARD

AMERICAN ABRASIVE METALS CO.

FERALUN—BRONZALUN—ALUMALUN—NICALUN

Names Reg. U. S. Pat. Off.

50 Church Street, New York City

BRANCH OFFICES

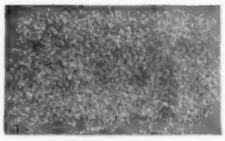
BOSTON, 136 Federal Street
CHICAGO, 111 W. Washington Street
LOS ANGELES, 2071 Laura Avenue
PHILADELPHIA, 1700 Walnut Street
PITTSBURGH, Farmers Bank Building
SAN FRANCISCO, 405 Call Building

AGENTS IN PRINCIPAL CITIES

HATCH SURFACE

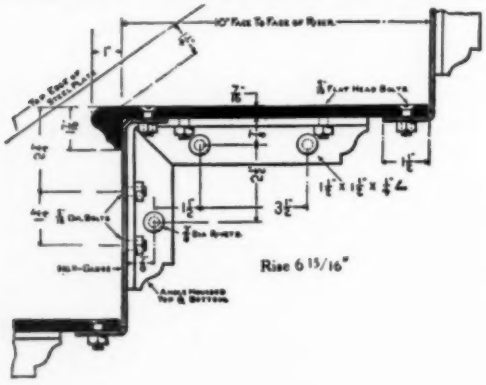
FERALUN
Anti-Slip Treads

Spell SAFETY in Your School



PLAIN SURFACE

FOR NEW BUILDINGS—STYLE "S"

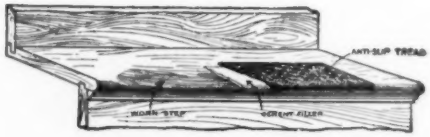


THE STYLE "S" STRUCTURAL TREAD

has been especially designed for school installation. Its acceptance by architects and school boards is becoming steadily wider. It affords the most economical as well as the most satisfactory method of insuring safe anti-slip stairways, with complete and permanent freedom from the expense and annoyance of repairs or renewals.

Style "A"
WITH METAL ANCHORS FOR NEW CONCRETE STEPS

FOR REPAIR WORK—STYLE "A"



THE STYLE "A" TREAD

is widely used for the repair of worn stairs. Typical conditions are shown above. Repairs so made are inexpensive and permanent.

This type of tread is also recommended for use with new concrete stairs.

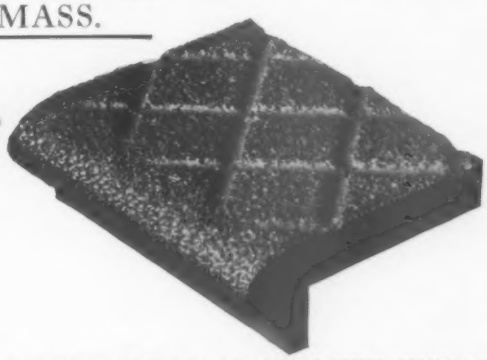
SAFE STAIRWAYS PREVENT ACCIDENTS

Write for Details and Prices

THE AMERICAN SCHOOL AND UNIVERSITY

AMERICAN MASON SAFETY TREAD CO.

GENERAL OFFICE AND FACTORY
LOWELL, MASS.



PREVENT ACCIDENTS WITH AMERICAN MASON SAFETY TREADS

American Mason Safety Treads provide almost complete immunity from slipping. In addition, they insure greater durability for stairs of any type. They are especially desirable for stairs in school buildings wherever the traffic is heavy, for thresholds of doors, and for ramps and floors around heavy machinery in school shops. Suitable for use on granite, marble, slate, cement, iron or wood—new or old construction—they are especially desirable on concrete stairs, as they prevent the raw edge from chipping off.

REPAIR WORN STAIRS WITH AMERICAN MASON SAFETY TREADS

For repairing purposes, Mason Safety Tread is ideal. The worn portion of the stair is built up to the level with Karbolith or cement filling, on which is placed the Safety Tread. Steel, Brass or Aluminum Nosings may be attached to the Safety Tread for attractive finish or to cover up the filling on badly worn stairs.

Our long experience enables us to give directions for the repair of any stairway, of any material and any degree of wear. We will furnish without obligation suggestions, sketches or blueprints, showing just how the work can be done best and at the lowest cost.

A SAFETY TREAD OF ABRASIVE METAL

Above is shown a special type of American Mason Safety Tread, in which a carborundum or aluminous abrasive has been embedded in the wearing surface of the molten metal. The flint-like particles of the abrasive project above the surface, producing a surface that effectively prevents slipping, whether wet or dry. The treads can be furnished in three surfaces—fluted, diamond-hatched as above, or plain. The body metal may be of iron, bronze, aluminum or nickel, dependent upon the type of service for which the tread is intended or the architectural effect desired. Certain styles require no subtread and can be used with or without a riser. These treads are easily and quickly installed on either new or old work.

MASON ROLLED STEEL, EXTRUDED BRASS OR ALUMINUM DOOR SADDLES

These are recommended wherever appearance and protection against wear and slipping are desired. Door Saddles are furnished with corrugated surface as illustrated. Brass only is available in either corrugated or plain surface.

BEFORE REPAIRING

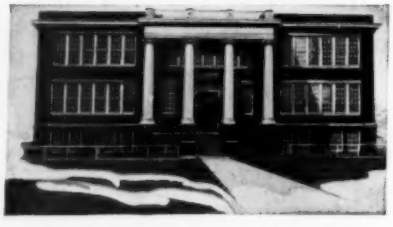
AFTER REPAIRING

Write for a copy of our illustrated booklet and the name of our nearest agent

CHAMBERLIN METAL WEATHER STRIP CO., Inc.

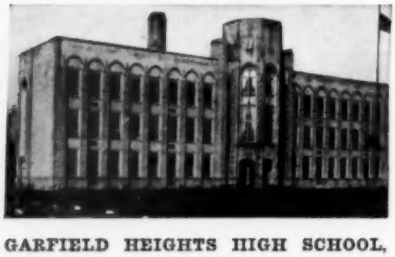
Detroit **CHAMBERLIN WEATHER STRIPS** "SINCE 1893-THE STANDARD" Michigan

(Branches in more than 100 cities)



CHERITON HIGH SCHOOL, VA.

ANACONDA JUNIOR HIGH SCHOOL, MONT.



GARFIELD HEIGHTS HIGH SCHOOL, OHIO

HARVARD COLLEGE, MORGAN HALL, CAMBRIDGE, MASS.

Consider your windows . . .

No matter what type they are—that's where heat is lost. That's where Chamberlin Weather Strips save money.

Chamberlin Metal Weather Strips are a sound, lasting investment which yields dollars and cents dividends. By effecting tremendous savings in fuel they pay for themselves in from three to five years. They last as long as the building stands . . . are a permanent **economy** feature. Schools equipped with Chamberlin Metal Weather Strips are easier to heat and the health of students is protected through the elimination of drafts.

Now is the time to have the windows and doors in your buildings equipped with Chamberlin. There is Chamberlin Weather Stripping for every type of window—double hung, projecting, pivotal and others. Installation is made by factory-trained experts and is guaranteed to be satisfactory in every way. For 40 years this nationally known organization has had a reputation for using only the highest quality materials and of giving the finest workmanship.

Now Saving Money for more than 9000 Schools and Universities

Schools, universities and homes all over the country testify to the value of Chamberlin Weather Strips. The pictures on this page show four of the 9000 schools which are Chamberlin equipped. Names of others near you will be furnished on request for reference.

A Chamberlin representative will be glad to meet with you or the Governing Board to discuss particulars and exact costs of Chamberlin protection. No obligation, of course. Address our nearest office (listed in telephone book) or Chamberlin Metal Weather Strip Company, Inc., Detroit, Michigan.

THE DETROIT STEEL PRODUCTS COMPANY

2250 East Grand Boulevard, Detroit, Michigan

FACTORIES: Detroit, Michigan; Cleveland, Ohio; and Oakland, California

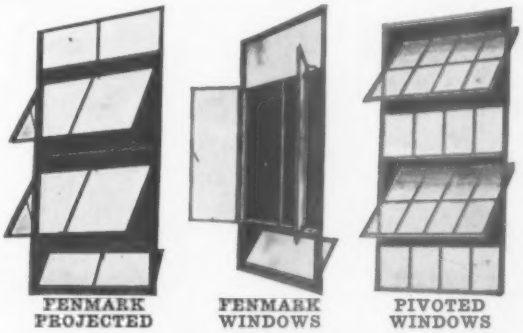
Fenestra STEEL WINDOWS

For class rooms, auditoriums, administration buildings, Fenestra "Fenmark" Windows have numerous advantages: Frames and sash of heavier, solid steel sections that do not warp, swell, shrink, stick or rattle. Fire resisting. Afford increased light, thus minimizing eyestrain; natural ventilation without draft, thus increasing health, efficiency. Upper swing leaves open out casement fashion, or swing out at bottom while sliding down from top. Easily washed from inside the building. Lower leaf tilts in, acting as a wind guard at sill. Ornamental solid bronze hardware.

Screens easily attached where required. Wide variety of standard types and sizes sufficient for all ordinary building needs. Any amount of clear opening provided up to 100 per cent. Complies with all building code requirements and accepted ratio of window area to floor area as established for schools.

For gymnasiums, laboratories, locker rooms, swimming pools, power houses, and other subsidiary buildings, Fenestra horizontally pivoted or projected windows are desirable. Ventilators either manually or mechanically operated, singly, in banks or in tiers.

Self-locking cam handles. Can be arranged to open entirely outside the building to accommodate shades. Operation easily controlled from centrally located operating points. Fire hazards minimized. Insurance premiums reduced. Small glass lights permit easy and economical replacement when broken.



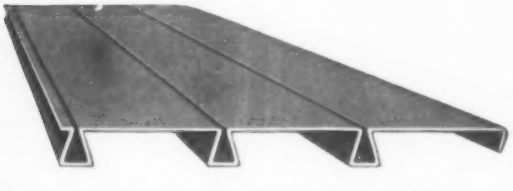
FENMARK PROJECTED WINDOWS — FENMARK PIVOTED WINDOWS

Fenestra Engineers gladly discuss daylighting and "airation" problems, assist with window layouts, provide estimates on alternate types.

Fenestra erection force erect and install all windows where desired, insure satisfactory installation and efficient operation. A complete service.

Complete Specifications and Details in Sweet's Architectural Catalogues.

Fenestra Holorib steel roof decks, insulated, are light, durable, economical. Shed summer heat. Save winter fuel. An ideal base for felts, tile, slate or other roofing material. Quickly laid in any weather. Applicable to any type or pitch of roof.



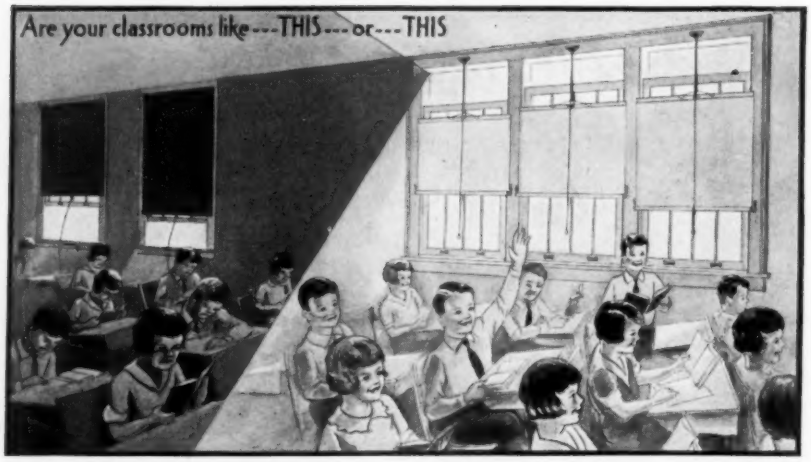
Fenestra **Sanacoustic** Holorib is widely used in ceilings of auditoriums and gymnasiums, to improve acoustics and deaden noises.

LUTHER O. DRAPER SHADE CO.

Makers of Better Shades for Over a Quarter Century

Spiceland, Indiana

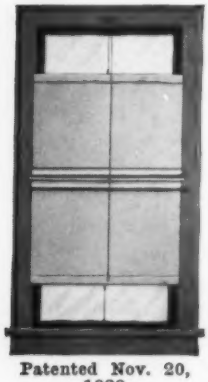
There is no satisfactory substitute for NATURAL DAYLIGHT



Give your pupils shades that LIGHT UP—that do not darken your classrooms

Shades that Keep the Sun's Glare OUT But let all the Light IN!

Protect your pupils from window shades that in keeping out the glare of the sun, also shut out LIGHT. Shades that cause semi-darkened classrooms . . . inadequate working light that often leads to eyestrain, nearsightedness and nervous disorders.

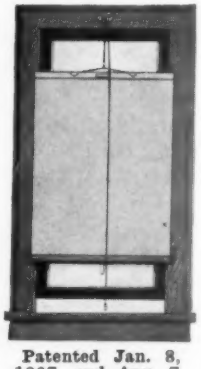


Patented Nov. 20, 1928
DRAPER STYLE "V" DOUBLE ROLLER SHADE

Without natural, evenly distributed daylight, your pupils are handicapped. They become fidgety — difficult to control — slowed-up mentally. Modern teaching methods cannot make up for such an omission.

Give your pupils the NATURAL DAYLIGHT to which they are entitled. You CAN, by installing draper ADJUSTABLE shades. These shades keep the sun's glare OUT . . . but let all the useful light IN!

They are adjustable from both the top and bottom of the window. That permits the valuable top light to reach not only the desks close to the windows but also the rows of desks farthest from the windows. Beyond this, windows may be opened from the top without flapping of shades to distract, thus providing correct ventilation.



Patented Jan. 8, 1907, and Aug. 7, 1923
DRAPER SANITARY ROLLER SHADE

Dratex shade fabric keeps out the sun's glare . . . diffuses the rays and lets in the soft, mellow light. . . . ALL the light that your classrooms would get without shades, but with glare ELIMINATED. Durable, easy to install, economical, Draper shades meet the needs of modern schools and education as no other window shade can.

Interesting literature and sample of Dratex fabric sent free to educators. Please address Department A. S.

THE BEST LIGHT ENTERS THROUGH THE UPPER THIRD OF THE WINDOW

E. I. DU PONT DE NEMOURS & CO., INC.

Newburgh, N. Y.

DU PONT TONTINE

REG. U.S. PAT. OFF.

(Pronounced *Ton-teen*)

THE *WASHABLE* WINDOW SHADE

The school pictured here is but one of thousands from Maine to California equipped with Tontine Window Shades. And there are very good reasons why schools and universities select Tontine Shades:

They Are Washable

In fact, they're scrubbable. Soap, water and a brush soon remove every trace of dust, dirt and fingermarks—and with absolutely no damage to the shade.

They Are Durable

Tontine Shades are impregnated with pyroxylin—the same basic substance that's in the Duco finish on a car. That's why Tontine Shades are durable. Why they last for years and years. Why they don't fray, or pinhole or wear thin. Why sunlight does not fade them. Nor rain stain them.

MARY GROVE COLLEGE, DETROIT, MICHIGAN. THE TONTINE WINDOW SHADES IN THIS COLLEGE BUILDING HAVE BEEN UP FOR SIX YEARS. THEY'RE STILL IN FINE CONDITION—KEPT FRESH BY OCCASIONAL SCRUBBINGS WITH SOAP AND WATER

They Are Good-looking

These shades come in a large variety of fresh looking tints and well chosen designs. And they retain their original beauty through years of service.

They Save Replacement Costs

Replacement costs are a big item to consider. Tontine Shades last for years and years—so long, that replacement costs are reduced to a minimum. They are the most economical shades you can buy. For complete satisfaction have them mounted on Tontine Guaranteed Rollers.

Let Us Send You Samples

We'll gladly send you a book of samples of Tontine Shades to test out as you wish. Try scrubbing them hard and see how they come out. Expose them to strong sunlight—or make any other test you wish. We'll also gladly send you a list of the schools, colleges and universities now using Tontine Shades.

DU PONT MURALART

REG. U.S. PAT. OFF.

THE *WASHABLE* FABRIC WALL COVERING

Du Pont Muralart is a new washable fabric wall covering which has gained favor with many leading architects, decorators and large building owners throughout the country. It has these outstanding advantages:

Its surface is of the same basic material as that used in du Pont Duco.

It is washable and waterproof—repeated washings will not harm it.

It can also be washed down without injury with a 5 per cent solution of carbolic acid, Dakin's solution, Lysol, or any other well-known disinfectant.

It is extremely resistant to scuffing and rubbing and is easily applied by an interior craftsman—and with no muss or inconvenience.

Because of its strong fabric base it bridges old cracks and acts as a surface support.

Du Pont Muralart has character because it is obtainable in a wide variety of interesting textures and colors.

Upon request we shall be pleased to forward to interested architects and school men sample book containing twenty-four colors.

THE ELECTRIC STORAGE BATTERY CO.

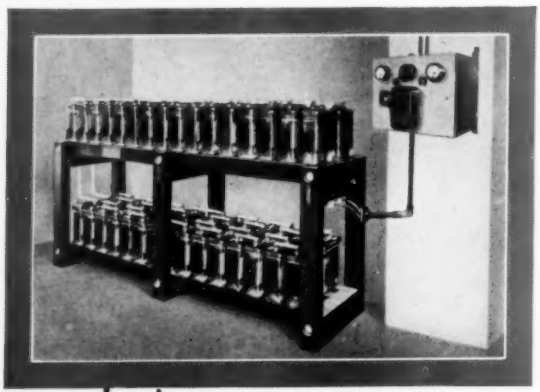
World's Largest Manufacturers of Storage Batteries for Every Purpose

Allegheny Avenue and Nineteenth Street, Philadelphia

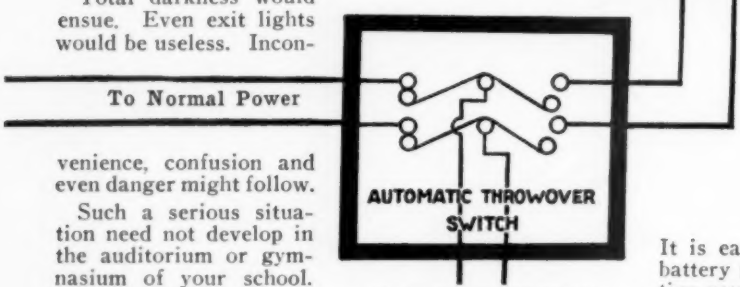
BRANCHES IN 17 CITIES THROUGHOUT THE UNITED STATES

FOR SAFETY . . . EMERGENCY LIGHTING

Your auditorium or gymnasium is crowded with pupils at lectures, plays, sports, or dances. What would happen if lighting current should suddenly fail?



Total darkness would ensue. Even exit lights would be useless. Inconvenience, confusion and even danger might follow.



IMPORTANT CIRCUITS PROTECTED

Auditoriums Hallways
Gymnasiums Firetowers
Class Rooms Stairways
Exits

Such a serious situation need not develop in the auditorium or gymnasium of your school. Today, absolutely dependable emergency lighting protection, which is automatic and instantaneous in its operation, is available to you in the form of an Exide Emergency Lighting Battery System.

Exide

EMERGENCY LIGHTING BATTERY SYSTEMS

SIMPLE, EASY OPERATION

The Exide Emergency Lighting Battery System —which consists of Exide Batteries and reliable devices to automatically control and charge the battery—is not complicated. The operation of this system is absolutely dependable. Furthermore, it is self-sustaining since it automatically and instantaneously furnishes the needed electric current during the full emergency period without a hand touching a switch, and because it automatically recharges the battery after the emergency discharge.

MEETS BUDGET APPROPRIATIONS

Exide Emergency Lighting Equipment comes in a wide range of sizes to suit the particular needs of your school and its budget appropriation. It is easy to install, requires no separate battery room, and practically all the attention required is the addition of water every month or two.

DEPENDABILITY OF EXIDES

Behind every Exide Battery is over forty-four years of experience building dependable batteries for every purpose. This experience assures you of the following important features for an emergency lighting battery in school service:—absolute dependability, long life, freedom from care or trouble, moderate first cost and low operating and maintenance cost. Behind every automatic Exide control panel is the experience which the Exide Engineering staff has gained in providing similar control devices, particularly for central station emergency lighting and control bus service for the past twenty odd years.

SERVICE

Since each Emergency Lighting installation presents its own problems, The Electric Storage Battery Company maintains trained engineers in each of its 17 nation-wide branches, who will gladly assist you in planning installation.

For detailed information on the Exide Emergency Lighting Battery System write for Bulletins. No obligation.

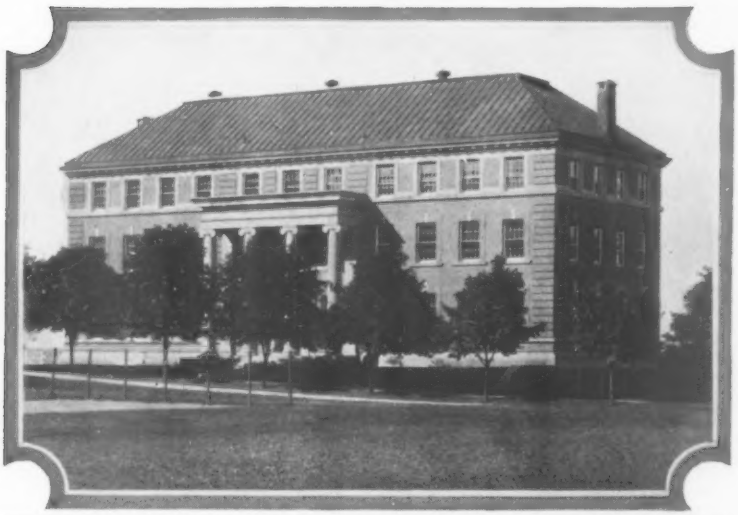
Dependable Exide Laboratory Batteries Available in Any Size, See Page 360

GLEASON-TIEBOUT GLASS COMPANY

CELESTIALITE "NEXT-TO-DAYLIGHT"

Registered and Patented

200 Fifth Avenue
New York, N. Y.



CIVIL ENGINEERING BUILDING, RENSSELAER POLYTECHNIC INSTITUTE EQUIPPED THROUGHOUT WITH CELESTIALITE LIGHTING GLASS

Since Rensselaer Polytechnic Institute placed their first order for Celestialite glass they have re-ordered nine times. Today, many of the Rensselaer buildings are equipped throughout with Celestialite. This is the endorsement of this well known college of the superiority of Celestialite glass. Among other well-known Institutions of learning that show their endorsement for this famous lighting glass are: Amherst College, Wesleyan University, Columbia University, Princeton University, University of Virginia, University of Pennsylvania, College of the City of New York, Stevens Institute of Technology, New High School of Commerce, San Francisco. Recent orders have been received for the Girls' Dormitory Building of Nebraska State Normal College, New Science Building, Mt. Holyoke College, Mt. Basil School, Pittsburgh, Roosevelt, Jr. High School, Altoona, Francis W. Pennington Elementary School, Mount Vernon; Boards of Education of Rochester, and Boston (100% equipped).

Authorities in schools and colleges such as the above choose lighting equipment only after they have made careful tests of various types of lighting systems. They choose Celestialite because, under its soft rays, students study better, teachers work more effectively, morale is raised, good health is promoted and general progress increased.

Celestialite is the ideal light for auditoriums, class-rooms, lecture-halls and laboratories.

We shall be pleased to send to any interested school authority a fragment of Celestialite glass showing its three-layer construction, and further information about correct lighting for schools and colleges.

Celestialite's three layer construction is the reason for its superiority:

1—a layer of crystal clear transparency for body and strength.
2—a layer of white glass to diffuse the rays and soften the light.
3—a layer of blue glass to whiten and improve the quality of the light.

THE HOLTZER-CABOT ELECTRIC CO.

Manufacturers of Electric Signaling and Protective Systems

EXECUTIVE OFFICES AND FACTORY

125 Amory Street, Boston, Mass.

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***Atlanta, Ga.**, H. Douglas Stier, 101 Marietta St.
Baltimore, Md., 1410 Standard Oil Bldg.
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Pittsburgh, Pa., 606 American Bank Bldg.
St. Louis, Mo., 1529 Arcade Bldg.
San Francisco, Calif., 939 Larkin St.
***Seattle, Wash.**, N. K. Staggs, 4227 35th Ave., South
Syracuse, N. Y., 403 Lafayette Bldg.
***Montreal, Canada**, Century Electric Co., 691 St. Paul St., West

* Agencies. All Other Offices Listed Are Strictly Company Maintained and Operated with Sales Engineers in Charge to Render Complete Engineering Service.

SCHOOL FIRE ALARM SYSTEMS

The functions of a fire alarm system in a school, should be: First, to so train the children by means of periodical fire drills that they will vacate the building quickly and without confusion; and Second, to call automatically the city fire department in case of actual fire. Any system which performs less than this is not giving to school children the fullest measure of protection from fire panic which should be theirs. Experience has shown that the best and most orderly response to fire alarm signals is secured in those communities where fire signals are uniform in all schools and are not used for any other purpose.

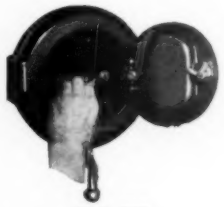
To best meet the above requirements, The Holtzer-Cabot Electric Co. unqualifiedly recommends its standard:

S. A. Fire Alarm System

This system is complete in that it provides for sounding a fire drill signal or a signal for actual fire that are both identical as far as the pupils can tell, with absolutely no chance of summoning the city fire department except for an actual fire. The operation of sounding a fire signal is shown in Cuts I and II.

CUT I

CUT II



CUT III

The sounding of an alarm for fire drill only is as shown in Cut III in which the front of the box is opened with a key. The opening of this door operates contacts which prevent the city fire alarm box from operating when the lever is pulled

The gong used with this system is of the electro-mechanical type, entirely distinctive from any other type of bell so that a fire signal can never be confused with other school signals

The entire system including all boxes and gongs and every foot of wire is supervised electrically so that any disarrangement of apparatus or break in any of the wiring is instantly indicated by a warning or trouble bell. All wiring, current feeders, etc., are centralized at a control panel provided with volt and ampere meter, relays, pilot lamps, etc., so arranged and connected as to facilitate the ready location of broken wires or other troubles that might impair the operation of the system.

Complete detailed information covering these and other fire alarm systems are available by writing for bulletin on School Fire Alarm Systems.

INTERSTATE SHADE CLOTH CO.

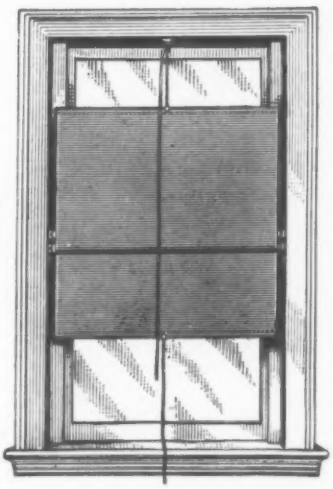
Hoboken, New Jersey

THE LAPSLEY-INTERSTATE SHADE CLOTH CO.,

Baltimore, Maryland

Double-Hung Window Shade Installation

Two window shades are installed at center of window. One shade may be pulled up to cover upper sash, the other shade pulled down to cover lower sash. Double-hung window shade installation is especially suitable for schools, since it permits control of light and ventilation.



"Inter-Twill" — The Long Wearing Shade Cloth

An improved type of shade cloth with the strength in the twill. We believe it is the toughest and strongest shade cloth and will outwear them all. It will stand abuse and rough usage. The threads will not "burn" when exposed to the sun's rays. It has special Interstate protective coating which makes it easily cleanable, reversible and long wearing. Soil is easily removed from its surface. The manner in which the twill fabric is woven insures the extra years of service. It is pure finished, and unfilled, no clay or other fillings used in the manufacture. Made in any color tone and in any combination of colors.

To darken auditorium—if total exclusion of light is desired, specify "LITE-PROOF" Shade Cloth. Shadowless and light-proof in all colors including light colors and white.

Also: Silver Screens for motion pictures

INTER-TWILL
WINDOW
SHADES
WILL OUTWEAR THEM ALL
THE STRENGTH IS IN THE TWILL

JOHNS-MANVILLE

292 Madison Avenue, New York, N. Y.

NEW YORK CHICAGO CLEVELAND SAN FRANCISCO NEW ORLEANS TORONTO

Acoustical Treatment

There are two classes of acoustical correction for schools and universities. The first requirement is that of auditoriums and large class rooms where it is desirable to have the words of speaker or teacher distinctly audible in every seat; or where music may be presented without causing disturbing echoes or reverberations.

The second class of correction is required for reducing noise to an undisturbing level in halls, corridors, study halls, gymnasiums, swimming pools, restaurants and kitchens. Science has proved by conclusive tests the advantages of quiet for study and, conversely, the injurious effect on the nervous system that results from constant exposure to noisy surroundings. This means that acoustical treatment is really a **health** measure.

Johns-Manville pioneered in the development of the science of sound control and have a large staff of acoustical experts available for consultation either on proposed buildings or existing school or college structures.

J-M ACOUSTICAL TREATMENT APPLIED TO THE ASSEMBLY HALL OF JOHN HAY HIGH SCHOOL, CLEVELAND, OHIO

There is a wide range of J-M sound control materials adaptable to the needs of any kind of room. They can be applied over any present wall or ceiling surface and lend themselves readily to any desired decorative scheme.

Bonded Built-Up Roofs

The construction of most school and college buildings is admirably suited to the protection afforded by a J-M Built-Up Roof. These Roofs are constructed of alternate layers of asbestos felts and asphalt with smooth or gravel surfaces.

THE TILDEN HIGH SCHOOL, BROOKLYN, PROTECTED BY A J-M BUILT-UP ROOF

There are more than 20 types of J-M Roofs to select from. These roofs are applied only by trained roofing firms selected by Johns-Manville for skill and integrity. They are known as J-M Approved Roofers.

All worry and care about leaks, fire and upkeep is removed for a specified term of years. Depending on the grade of roof selected, a bond backed by Johns-Manville and the National Surety Company will be issued to the purchaser —for 10, 15, or 20 years.

Tile Flooring

In halls, corridors, lobbies, vestibules, lavatories, restaurants, gymnasiums, laboratories, locker rooms, or wherever there is heavy traffic, J-M Tile Flooring Type A is specially recommended.

These tiles are long-wearing, resilient, comfortable, stain-proof, fire-resistant, of pleasing appearance and low in cost. They are furnished in a variety of colors and patterns that provide floors adapted to every need in educational buildings.

KERNER INCINERATOR COMPANY

3701 North Richards Street, Milwaukee, Wisconsin

OFFICES AND AGENCIES IN OVER 150 CITIES

PRODUCTS

The Kernerator Incinerators for the prompt, safe and sanitary disposal of garbage and rubbish of all kinds by burning at low cost. Made in four types

Flue-fed type
Basement-fed type
Estate (downdraft) type
Gas Fired (AI)

with various sizes and layouts to fit the need of any city, county, or district school, high school, college, university, or school dormitories—planned, building or existing.

Importance of the Kernerator for All Types of School Buildings

It has become the constant purpose of the school board members, the school superintendent, the architect and the builder—all those responsible for school design and construction—to make certain that equipment is provided that will promote safe and sanitary conditions in the school building.

Safety

There are probably no buildings in which the immediate and sanitary disposal of waste is as important as in schools. Statistics show a large percentage of fires are due to accumulations of loose waste paper and rubbish in school basements. Baling paper is a doubtful economy.

Panics

With fire-resistant construction, there is not much chance of **Material** damage. Smoke and fire are apt to produce **Panics** and panics are as perilous as fires. When a crowd of human beings is intent on escape from real or fancied peril, each one is an entity, with every faculty or power bent on self-preservation. If one falls, he has not only lost himself, but becomes a stumblingblock to those who follow, with the result that the loss of life and limb far exceeds the physical damage from the fire.

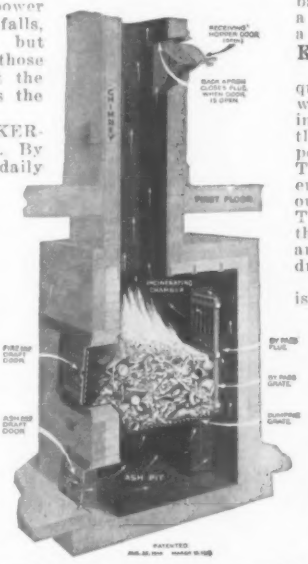
The proportionate cost of KERNERATOR equipment is very low. By eliminating the necessity for daily collections of loose waste paper and accumulations of this material in school basements, it provides a definite insurance against panic losses.

Sanitation and Hygiene

The KERNERATOR provides a convenient, sanitary and economical method for handling all sweepings, lunch remains, garbage from the cafeteria (if there is one) and all promiscuous waste.

There is no denying the fact that the sanitary waste from girls' washrooms is a constant source of maintenance expense for the cleaning out of clogged drains and damage from flooded toilets. This occurs in spite of receptacles placed in the washrooms.

Flues may be so located that one set of hopper doors will open into the girls' washrooms. This idea has been adopted by a number of architects (names upon request) with very satisfactory results in actual operation.



SECTIONAL VIEW SHOWING INTERIOR AND OPERATION OF KERNERATOR

Notice the draft reaching the point of burning through the by-pass grate. The fire is always on top of the burning material, consuming offensive odors.

Silent Doors

A gentle impulse will close the KERNERATOR receiving hopper door. The slight metallic clang of the door can be stilled by another exclusive KERNERATOR feature—the silent door. This is equipped with a device which eliminates unnecessary noise, a desirable feature in school installations.

KERNER SILENT DOOR

Economy

The KERNERATOR eliminates the expense of labor, time and equipment in handling, storing and transporting rubbish and garbage; the necessity of daily collections of waste paper and sweepings—frequent trucking. It also cuts the cost of plumbing repairs due to drains stopped by sanitary waste in girls' washrooms.

Service

The KERNERATOR is made and sold by the pioneer in the flue-fed incineration field. It is guaranteed for the life of the building, and this guarantee is backed by a financially sound organization having a stable, trained corps of incinerator experts with a wide experience in school installations.

Kernerator Operation

No gas, coal, or other commercial fuel is required except when there is a preponderance of wet garbage. Waste of all kinds, including sweepings, waste paper, tin cans, broken crockery, bottles and garbage (if any) are placed in the hopper doors, conveniently located on each floor. This refuse falls down the flue, into the incinerator combustion chamber. There it spreads out on the grates into a separated and loose pile. This permits the constant flow of air up through the Kerner by-pass flue, circulating through and around it, causing a considerable amount of air-drying between burnings.

When the incinerator is nearly full, the refuse is lighted from the top—a match does it. Due to the KERNER by-pass flue, the combustion is from the top downward, unburned gases passing through the flames destroying unpleasant odors. The fire feeds upon the waste paper and other dry combustible material; gradually drying the damp substances so that they also are reduced to ashes.

After several burnings, the ashes, along with cans, bottles and other non-combustibles (which are thoroughly flame sterilized), are dumped into the ash-pit for removal every few months.

Further Information

When you are making plans for a school building, may we send a specialist to discuss your waste disposal problems? He will be glad to recommend the proper type and size of equipment depending upon the number of rooms, number of pupils, and the height of the building.

Literature

Send for the new pamphlet "The School Incinerator" giving full information and a list of KERNERATOR installations in over 300 schools.

Also 2 and 3 Bushel Portable Incinerators are available

Specific data for Architects in Sweet's Architectural Catalog

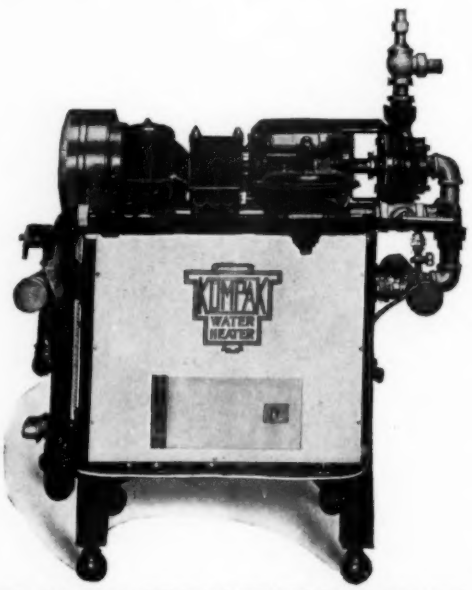
THE KOMPAK COMPANY

Manufacturers of

Gas Water Heaters for Lavatories—Showers—Swimming Pools

New Brunswick, N. J.

The Modern School or College requires hot water in large quantities—and after years of manufacture and research we have placed on the market a new type of Gas Water Heater, designed for the heavy duty required in such installations. This heater embodies new features which effect an economy of operation and durability never before obtained in any water heater. There are no copper coils and no cast iron water sections. The heating sections are of cast aluminum tested to 325 pounds pressure and guaranteed against corrosion or wear. The water is circulated by means of an electric pump, and the gas is burned under forced draft, greatly increasing the capacity and the efficiency of operation. One of the special features of this new heater is the entire absence of condensation; thus completely eliminating the rusting of the jacket which has heretofore shortened the life of all previous heaters when used for heavy duty.



THE KOMPAK TYPE M HEAVY-DUTY HEATER

This heater is made in several sizes, to be connected to different size storage tanks to take care of any possible hot water requirements. It is fully automatic and the water will be automatically held at any desired temperature. An automatic pilot prevents the escape of gas should the pilot go out.

The Kompak Heater is especially adapted for swimming pools, as the pump will circulate the water automatically and maintain a constant temperature. Where used with a storage tank for lavatories or showers, it is not necessary to elevate the tank, as the pump will circulate the water downward if desired.

Our engineers will be glad to co-operate with architects and engineers in recommending the proper size equipment.

In addition to the Kompak Type M heater for heavy duty we manufacture a complete line of domestic heaters from 20 to 100 gallons capacity. Made exclusively with copper tanks.

Full information on the entire line will be gladly sent upon request.

Established 1897

JOHN E. LINGO & SON, INC.

Manufacturers of

Flagpoles in Copper Bearing Steel, Bronze and Aluminum

29TH STREET & BUREN AVENUE, CAMDEN, N. J.

72-FT. OVERALL CONTINUOUS ENTASIS TAPERED COPPER-BEARING STEEL FLAGPOLE

12¾-in. butt x 5-in. top. One of two installations at Civic Center, Pasadena, Calif.

FOUR DISTINCT TYPES OF FLAGPOLES

Continuous Straight Tapered Flagpoles are made of steel in one piece in lengths from 20 feet to 100 feet and are tapered conically with a smooth uninterrupted exterior surface throughout without visible points or offsets. These poles are standardized and carried in stock for immediate shipment, and are sold in the same price range as the extra heavy swaged sectional poles.

Continuous Entasis Tapered Flagpoles are made of copper-bearing steel, bronze or aluminum in one piece in lengths from 12 feet to 100 feet and are tapered with Venetian entasis, having a smooth uninterrupted exterior surface throughout without visible joints or offsets. These poles are specially designed for memorials, monuments and buildings of exceptional architectural value. They are standardized but not carried in stock, being made to order only.

Swaged Sectional Flagpoles are fabricated in sections of copper-bearing steel pipe and standardized in lengths from 17 feet to 150 feet. Shop joints and field joints are made without the use of bolts, pins, rivets, screw couplings or lead calking. These poles are shipped in knocked-down sections with easy assembly at erection site, no tools other than an ordinary hammer and calking chisel being necessary to accomplish this work.

Equipoise Tilting Flagpoles are Swaged Sectional or Continuous Entasis Tapered steel poles in lengths from 20 feet to 40 feet, equipped with a counterbalanced arrangement which allows the pole to be lowered for repainting or installing halyards.

CATALOGS AND SERVICE

Catalogue and pamphlets giving full information, details and specifications, etc., will be gladly mailed on request.

Our Engineering Department will gladly assist you in planning your contemplated flagpole installations most satisfactorily and economically without obligation whatsoever.

MAZDA SUNLIGHT LAMPS

Made by
the Companies Listed Below

FOR SCHOOLS AND KINDERGARTENS

Type S-1

Type S-2

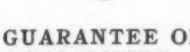
Recognition of the need of ultra-violet radiation indoors during the school months is spreading rapidly. Ultra-violet activates Vitamin D, which is important in contributing to the development of strong bones and sound teeth. The effectiveness of ultra-violet as a cure for rickets and a preventive of rachitic tendencies has been proved.

MAZDA Sunlight Lamps have important advantages for use in schools. They supply good light; they do not require the use of goggles; they are noiseless and odorless; their operation is simple; they are **safe.**

At distances which are specified in directions with each unit, MAZDA Sunlight Lamps (Type S-1 and Type S-2) radiate ultra-violet equivalent to that of the best midday midsummer sunshine. Special fixtures required for the use of these lamps are produced in many attractive designs.

For complete information, write to any of the twenty leading fixture manufacturers listed here, or address 2170 Keith Building, Cleveland, Ohio, to get a free copy of the informative booklet, "Ultra-Violet for Everyone." It describes MAZDA Sunlight Lamps and illustrates many of the special fixtures required for their use.

MAZDA Sunlight Lamps radiate ultra-violet in the Margaret Tuger School, Herkimer, N. Y.



A GUARANTEE OF RELIABILITY

This emblem is a guarantee that the fixture to which it is attached has been tested and approved for illumination and ultra-violet effectiveness when used with the MAZDA Sunlight Lamp (Type S-2). Purchasers should look for this emblem when buying fixtures for the MAZDA Sunlight Lamp

Babies in the Hebrew Kindergarten and Infants' Home at Far Rockaway, N. Y., are radiated with ultra-violet from MAZDA Sunlight Lamps

Manufacturers

BEARDSLEE CHANDELIER MANUFACTURING CO.,
216 So. Jefferson St., Chicago, Ill.
BENJAMIN ELECTRIC MFG. CO.,
Des Plaines, Ill.
BRADY MANUFACTURING CO.,
565 E. Larned St., Detroit, Mich.
CURTIS LIGHTING, INCORP.,
1123 W. Jackson Blvd., Chicago, Ill.
DOMINION ELECTRICAL MFG. CO., 712 Ontario Ave., W., Minneapolis, Minn.
J. M. FELDMAN CO., INC.,
740 So. Wall St., Los Angeles, Cal.
THE FRINK CORPORATION,
23-10 Bridge Plaza So., L. I. C., N. Y.
GENERAL ELECTRIC COMPANY,
Merchandise Department, Bridgeport, Conn.
THE EDWIN F. GUTH CO.,
Jefferson & Washington Aves., St. Louis, Mo.
HEALTHMASTER SUN RAY LAMP DIVISION, LIBERTY ELECTRIC CO.,
50 W. North St., Indianapolis, Ind.
HOLOPHANE COMPANY, INC.,
342 Madison Ave., New York, N. Y.
THE KAYLINE COMPANY,
600 Huron Rd., Cleveland, O.
LIGHTOLIER COMPANY,
569-575 Broadway, New York, N. Y.
LUMINATOR, INC.,
851 Washington Blvd., Chicago, Ill.
THE MILLER COMPANY,
Meriden, Conn.
MOE-BRIDGES COMPANY,
220 No. Broadway, Milwaukee, Wis.
MUTUAL SUNSET LAMP MFG. CO.,
Empire State Bldg., New York City
S. ROBERT SCHWARTZ & BRO.,
160 Varick St., New York, N. Y.
THE F. W. WAKEFIELD BRASS CO.,
Vermilion, O.
WESTINGHOUSE ELECTRIC AND MANUFACTURING CO.,
Edgewater Park, Cleveland, O.

MORSE BOULGER DESTRUCTOR COMPANY

207-B East 42nd Street, New York, N. Y.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

INCINERATION

Incineration is the answer to one of the serious problems of school administration presented by the increase in food service and the demand for higher standards of safety and sanitation.

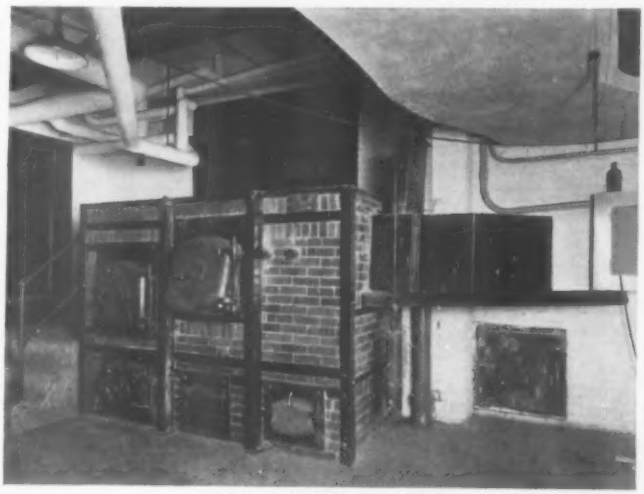
It eliminates an unpleasant and dangerous nuisance—storage of odorous, germ-breeding garbage awaiting the collector. It removes a serious fire hazard—the accumulation of papers and rubbish, inviting the birth of small fires and encouraging the growth of great ones.

MORSE BOULGER DESTRUCTORS

Morse Boulger Destructors are designed to economically take care of the incineration requirements of each installation. Different types are used for the disposal of garbage, rubbish and combinations of garbage and rubbish. The proper type, capacity, method of charging and other details are determined only after a careful study of the requirements so that the operation will be economical and foolproof.

Special Destructors are built for the disposal of animal and human remains from anatomical laboratories in medical schools.

Every Morse Boulger Destructor carries a permanent guarantee to operate without nuisance from smoke and odors.



TYPICAL INSTALLATION

They are the product of a company which has been engaged for over thirty-seven years exclusively in the design and construction of incinerators. Hundreds of Destructors are in operation in all parts of the world burning almost every conceivable kind of waste.

COSTS

The operating costs of Morse Boulger Destructors are low, as economical use is made of the rubbish and commercial fuel for burning up the garbage or other wet materials. Only part time of one man is ordinarily needed for operation. The advantages of incineration can be had at costs often less than for disposal by other means.

Maintenance costs are low, for the Destructors are heavy-duty equipment—properly designed and ruggedly built of materials proven in the severe service of incineration.

NEW AND EXISTING BUILDINGS

Leading school architects are including incineration and specifying Morse Boulger Destructors in new projects. If you are planning a new school, a Morse Boulger Destructor should be shown on the plans.

Destructors can readily be installed in existing buildings at low cost as they are complete and independent of any other equipment.

Detailed information, dimensions, capacities and prices will be furnished on request.

GARBAGE AND RUBBISH DESTRUCTORS

New Jersey College for Women, New Brunswick, N. J.
Newcomb College, New Orleans, La.
Pennsylvania State College, State College, Pa.
Western Reserve University, Cleveland, Ohio
Holy Name College, Washington, D. C.
Sarah Lawrence College, Yonkers, N. Y.
Mt. St. Joseph College, Chestnut Hill, Pa.
St. Francis Xavier College, New York, N. Y.
Meharry Medical College, Nashville, Tenn.
Roosevelt High School, Altoona, Pa.
New Senior High School, Altoona, Pa.
Old Senior High School, Altoona, Pa.
White Plains High School, White Plains, N. Y.
Masters School, Dobbs Ferry, N. Y.
Taft School, Watertown, Conn.
St. Mary's Seminary, Baltimore, Md.
St. Charles' Seminary, Overbrook, Pa.

ANATOMICAL DESTRUCTORS

University of Pennsylvania, Philadelphia, Pa. (2)
University of Rochester, Rochester, N. Y.
Iowa State College, Ames, Iowa
Meharry Medical College, Nashville, Tenn.
Duke University, Durham, N. C.
University of Texas, Galveston, Texas

HEAVY-DUTY INCINERATION

MORSE BOULGER DESTRUCTORS

Affiliated with Kerner Incinerator Company of Milwaukee
Originators and Largest Manufacturers of Flue-Fed Incinerators

THE MURPHY-DAVIS SIGNAL CO.

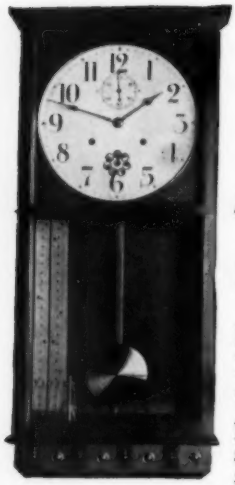
Topeka, Kansas

MANUFACTURERS OF

MURDA

Program Clocks for Schools

Designed to Give Service—Not to Require It



$150 F. O. B. FACTORY
Install it yourself

Program Clocks

Our program clock has a very sturdy hand-wound mechanism, the marked dependability of which is an invaluable feature in small schools. Built upon a No. 86 Seth Thomas movement, it will operate the bells automatically on four separate circuits, silencing them at night and on Saturday and Sunday.

The Murda has an enviable record, unapproached by any other program device. Every user is a booster. Service charges are unknown.

There is hardly a chance for failure of operation. No need for automatic self-regulating features, because time and program are permanently synchronized through single-unit mechanical operation. Designed to fill an urgent need for trouble-free operation outside of large cities where experts are not readily available, but equally efficient in large schools and groups of buildings. Because of its uniformly satisfactory performance this type of program clock will never become obsolete.

TELEPHONE AND FIRE ALARM SYSTEMS

Secondary Clocks, Signal Equipment

We furnish secondary clocks which are operated independently of the program clock. Instead of one impulse each minute, there is a steady imperceptible movement of the hands in the natural manner. Each clock has a separate electrically wound movement and is corrected hourly.

Murda signal equipment is especially adapted to school service, and it should be recognized that an original installation of suitable equipment helps to avoid the possibility of future bell troubles. Unsuitable equipment no matter how expensive often causes troublesome rearrangement in years to come. It pays to standardize on Murda equipment.

A Decided Economy

Secondary clocks may be considered unnecessary in a school, but automatic program control is of paramount importance. Through clock watching and inaccuracy in ringing class signals, much time is lost and school efficiency is lowered. With the probability of saving $150 worth of time in a single year of automatic program control, it is evident that no school, large or small, can afford to do without a Murda for even one year. Its purchase is a decided economy.

THE POWERS REGULATOR COMPANY

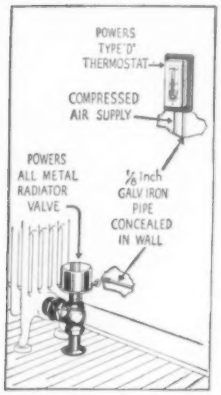
40 Years of Specialization in Temperature Control

2724 Greenview Avenue
Chicago

OFFICES IN 43 CITIES
See your phone directory

231 E. 46th Street
New York

Automatic Temperature Control for Heating and Ventilating Systems



The Powers Pneumatic System of Temperature and Humidity Control for heating and ventilating systems will give the biggest return on heat control. The Powers Vapor Disc Thermostat and All-Metal Valve often cost more, but are worth more—because of the following reasons:

(1) They often give 15 to 20 years of Accurate and Dependable Control without repairs of any kind.

(2) Greater Steam Economy owing to the fact that thermostats do not get out of adjustment and permit overheating.

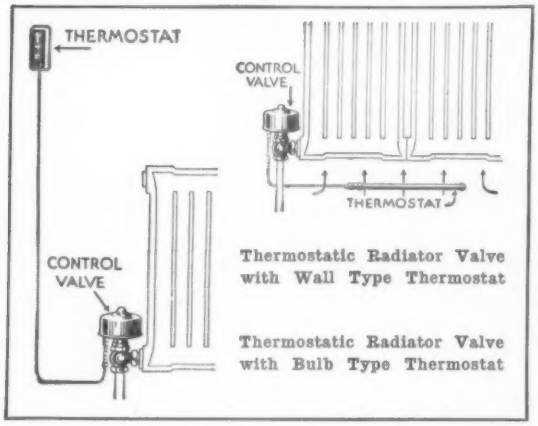
(3) Greater Comfort and Health of occupants of rooms—temperature is neither too hot nor too cold—but just right.

(4) A minimum of Service Calls and the trouble and annoyance connected with them.

Write for Estimate. Let one of our engineers study your particular requirements and submit an estimate of the cost of installing Powers Temperature Control. There is no obligation.

The Powers Thermostatic Radiator Valve. This self-contained thermostatic radiator valve will control the temperatures of classrooms, shops, corridors, etc., heated by direct radiation of vapor or vacuum heating systems. Requires no compressed air—is easy to install and affords an economical means of applying temperature control to heating systems already in operation. It also is particularly adapted to control cabinet heaters and concealed radiation.

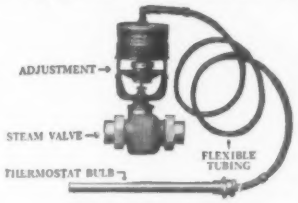
Write for Bulletin No. 260 which shows many different types of installations, dimensions, prices, etc.



Thermostatic Radiator Valve with Wall Type Thermostat

Thermostatic Radiator Valve with Bulb Type Thermostat

Regulator for Hot Water Heaters



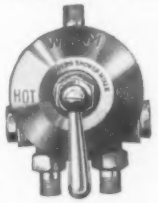
No. 11 Regulator

The Powers No. 11 Tank Regulator for steam-heated hot water service. Will pay for itself many times in steam savings. Self-contained—requires no compressed air—is easy to install. Accurate and dependable.

The Powers No. 10 Regulator for accurate regulation of large storage and instantaneous hot water heaters, swimming pools, drinking water systems, etc. Can be operated by either compressed air or water pressure.

Write for Bulletin No. 2035 for complete details and prices of these regulators.

Mixing Valves for Showers



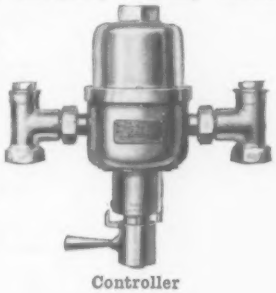
Shower Mixer

The Power Safety Shower Mixer absolutely prevents scalding caused by failure of cold water or pressure fluctuations in supply lines due to use of nearby fixtures. No sudden "shots" of hot or cold water. Maximum delivery temperature can be limited by Safety Stop.

Write for 22-page book describing this remarkable mixer.

The Powers Thermostatic Water Controller for group showers, gang showers, laundry wash wheels, etc. Will mix hot and cold water in quantities up to 100 gallons per minute and deliver at any temperature desired. Has fewer parts than any other thermostatic water mixer and is positively scaldproof.

Write for 16-page book for complete description.



Controller

READING IRON COMPANY

Established 1836

World's Largest Manufacturers of Puddled Iron Pipe

Philadelphia, Pa.

PRODUCTS

Reading Genuine Puddled Iron Pipe, in all sizes from ⅛" to 24" outside diameter; Genuine Puddled Iron Couplings and Nipples; all grades of Bar Iron; Reading Charcoal Boiler Tubes; Reading Cut Nails.

Reading Puddled Iron Pipe is the ideal pipe for school and university buildings because of its permanence, freedom from maintenance costs, and moderate first price.

Nearly four generations of service in prominent buildings of the Nation have proved that Reading Puddled Iron Pipe lasts as long as the building in which it is installed, resisting the combined destructive forces of rust, corrosion, vibration and electrolysis as does no other pipe material. Yet the initial price of Reading Pipe, for a complete installation, is only a few per cent higher than the initial cost of pipe which may have to be replaced entirely after only a dozen or so years of service.

WHY READING PUDDLED IRON GIVES BETTER SERVICE

Reading Puddled Iron possesses five distinct advantages: First, it is remarkably resistant to corrosion, due to the siliceous filaments uniformly distributed throughout every part of its structure. Second, Reading Puddled Iron is FIBROUS in structure—not crystalline—and is thus able to stand up under continued vibration and strain without breaking or snapping off. Because of its superior threading qualities, Reading Puddled Iron makes joints that stay tight. In addition, Reading Puddled Iron is remarkably easy to weld, and holds galvanizing or other coatings firmly.

FOR YOUR PROTECTION, INSIST ON READING

Accelerated laboratory tests are frequently used today to furnish "proof" that recently-developed metals have the same endurance as genuine Puddled Iron. The American Society for Testing Materials warns against the acceptance of accelerated corrosion tests as a proof of longevity in its Report of Committee A-5 (Vol. 28, Part 1, p. 150). Leading scientists are now generally agreed that ACTUAL SERVICE is the only true test of natural corrosion resistance.

The name READING and the Reading spiral knurl on every length of Reading Pipe are your guarantees that the iron you are buying has proved its worth in the tests of time—the only tests that count.

READING STANDARD PIPE

Genuine Puddled Iron—Black and Galvanized

	Size	List Price per Foot	Diameters External	Diameters Internal	Thickness	Weight per Foot Plain Ends	Weight per Foot Threads & Coupling	Thds. per Inch	Lgth. of Thd. Ins.	Taper per Foot Inch	Hydrostatic Test
Butt Weld	⅛	$0.05⅕	.405	.265	.070	.244	.245	27	.375	¾	750
	¼	.06	.540	.360	.090	.424	.425	18	.569	¾	750
	⅜	.06	.675	.489	.093	.567	.568	18	.574	¾	750
	½	.08⅘	.840	.618	.111	.850	.852	14	.748	¾	750
	¾	.11⅕	1.050	.820	.115	1.130	1.134	14	.760	¾	750
	1	.17	1.315	1.043	.136	1.678	1.684	11½	.944	¾	750
	1¼	.23	1.660	1.374	.143	2.272	2.281	11½	.968	¾	750
	1½	.27½	1.900	1.604	.148	2.717	2.731	11½	.984	¾	750
	2	.37	2.375	2.059	.158	3.652	3.678	11½	1.017	¾	1000
Lap Weld	2¼	.23	1.660	1.374	.143	2.272	2.281	11½	.968	¾	1000
	2½	.27½	1.900	1.604	.148	2.717	2.731	11½	.984	¾	1000
	2	.37	2.375	2.059	.158	3.652	3.678	11½	1.017	¾	1000
	2½	.58⅓	2.875	2.459	.208	5.793	5.819	8	1.512	¾	1000
	3	.76⅔	3.500	3.058	.221	7.575	7.616	8	1.575	¾	1000
	3½	.92	4.000	3.538	.231	9.109	9.202	8	1.625	¾	1000
	4	1.09	4.500	4.016	.242	10.790	10.889	8	1.679	¾	1000
	*4½	1.27	5.000	4.496	.252	12.538	12.642	8	1.725	¾	1000
	5	1.48	5.563	5.037	.263	14.617	14.810	8	1.781	¾	1000
	6	1.92	6.625	6.053	.286	18.974	19.185	8	1.887	¾	1000
	*7	2.38	7.625	7.011	.307	23.544	23.769	8	1.987	¾	1000
	8	2.50	8.625	8.059	.283	24.696	25.000	8	2.087	¾	800
	8	2.88	8.625	7.967	.329	28.554	28.809	8	2.087	¾	1000
	*9	3.45	9.625	8.927	.349	33.907	34.188	8	2.187	¾	900
	10	3.20	10.750	10.182	.284	31.201	32.000	8	2.300	¾	600
	10	3.50	10.750	10.124	.313	34.240	35.000	8	2.300	¾	800
	10	4.12	10.750	10.006	.372	40.483	41.132	8	2.300	¾	900
	*11	4.63	11.750	10.986	.382	45.557	46.247	8	2.400	¾	800
	12	4.50	12.750	12.078	.336	43.773	45.000	8	2.500	¾	600
	12	5.07	12.750	11.986	.382	49.562	50.706	8	2.500	¾	800
	14 O.D.		14.000	13.250	.375	53.510	55.712	8	2.625	¾	700
	15 O.D.	*Prices on Application*	15.000	14.250	.375	57.437	59.859	8	2.725	¾	700
	16 O.D.		16.000	15.250	.375	61.364	63.927	8	2.825	¾	600
	17 O.D.		17.000	16.250	.375	65.292	69.436	8	2.925	¾	550
	18 O.D.		18.000	17.250	.375	69.219	73.681	8	3.025	¾	550
	20 O.D.		20.000	19.250	.375	77.073	82.078	8	3.225	¾	550

Furnished with threads and couplings and in random lengths unless otherwise ordered. Random lengths are considered to be 16 to 22 feet. Five (5) per cent may be jointers. When ordered with plain ends, five (5) per cent may be 12 to 16 feet.

All weights given in pounds; dimensions in inches. All weights and dimensions are nominal.

The weight per foot of pipe with threads and couplings is based on a length of 20 feet, including the coupling, but shipping lengths of small sizes will usually average less than 20 feet.

Permissible variation in weight is 5% above and below the weights given in table.

All pipe threaded to Briggs' Standard Gauges as made by Pratt & Whitney Co., Hartford, Conn.

For cut lengths an extra charge will be made above random lengths.

For pipe plugged and reamed, an extra charge will be made above Standard Pipe.

For Galvanized or Coated Pipe an extra charge will be made above Black.

When ordering sizes 8-inch to 12-inch please state weight of pipe wanted.

On sizes 1¼", 1½", 2", butt-weld pipe will be furnished unless otherwise specified.

* These sizes are listed but are not standard; earlier delivery can generally be made of the other sizes.

REPUBLIC STEEL CORPORATION

Youngstown, Ohio

SALES OFFICES AND DISTRIBUTORS IN ALL LARGE CITIES

The fact that school and university buildings represent long time investments running into many thousands of dollars makes the selection of pipe a decision of real responsibility.

Many of the newer schools, a few of which are illustrated below, are equipped with Toncan Iron Pipe in plumbing and heating systems. The selection of Toncan Iron in every case followed a thorough investigation of its qualities.

Toncan Iron is an alloy of refined iron, copper and molybdenum. Tests in the laboratory and in actual service have shown that it ranks first among the ferrous metals, after the more expensive stainless steels, in its resistance to rust and corrosion. This quality makes for longer trouble-free life in all types of service in buildings, with a resulting economy hard to estimate because repairs to inferior pipe can soon mount to almost unbelievably high figures.

Toncan Iron Pipe is easy to work—it bends, cuts and threads easily, the savings in fabrication and installation often more than offsetting its slightly higher cost.

TONCAN COPPER MO-LYB-DEN-UM IRON PIPE

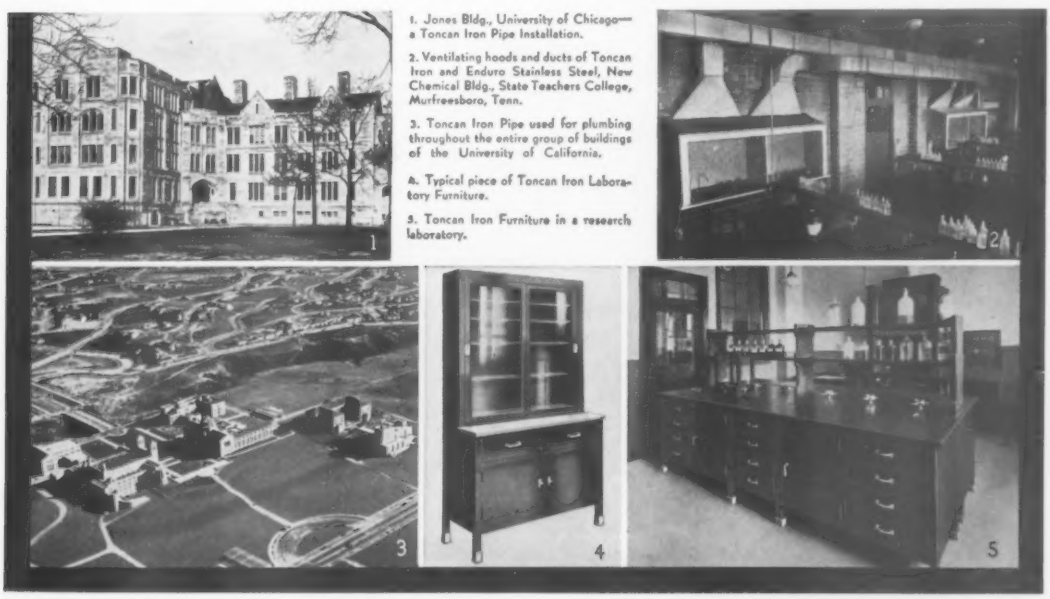
It is made in standard, extra heavy and double extra heavy weights, black and galvanized. It can be used wherever pipe is required in air, gas, hot and cold water, steam, drainage and vent lines, with highly satisfactory results.

Every length of Toncan Iron Pipe is painted blue and marked with the name Republic in raised letters. Couplings are blue and stamped RT.

Write for a copy of "Pipe for Permanence"—sixty-four pages of interesting money saving information and facts about the remarkable performance of this rust-resisting pipe.

Toncan Iron Sheets—Toncan Iron is also available in sheet form. It is ideal for all exposed metal work—roofing, gutters, downspouts, ventilating ducts, etc. It is ductile, therefore easy to work. Its resistance to corrosion is uniform throughout the entire thickness of the sheet. Hundreds of installations are illustrated and described in "The Path to Permanence," a copy of which will be sent upon request.

We shall also be glad to send catalogs showing complete laboratory equipment made of Toncan Iron.



1. Jones Bldg., University of Chicago—a Toncan Iron Pipe Installation.

2. Ventilating hoods and ducts of Toncan Iron and Enduro Stainless Steel, New Chemical Bldg., State Teachers College, Murfreesboro, Tenn.

3. Toncan Iron Pipe used for plumbing throughout the entire group of buildings of the University of California.

4. Typical piece of Toncan Iron Laboratory Furniture.

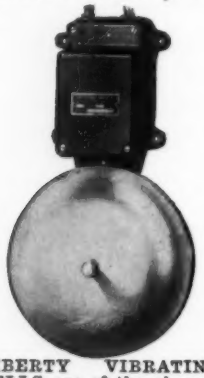
5. Toncan Iron Furniture in a research laboratory.

THE THOMAS-SMITH COMPANY

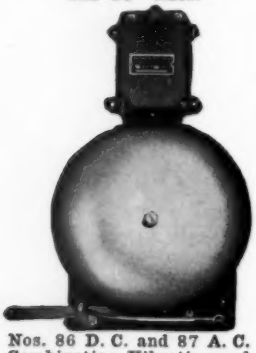
Canton, Ohio

BRANCHES IN PRINCIPAL CITIES

Electrically and Mechanically Operated Fire Alarm Systems
Electric Bells and Signals



LIBERTY VIBRATING BELLS are of the plunger hammer type. Nos. 6-Jr. D. C. and 7-Jr. A. C. are made in 3", 4", 5" and 6" sizes, and Nos. 6 D. C. and 7 A. C. in 6", 8", 10", 12" and 14" sizes.



Nos. 86 D. C. and 87 A. C. Combination Vibrating and Mechanical Bells are especially adapted for fire signals. They are made in 8", 10" and 12" sizes.

Nos. 811 D. C. and 812 A. C. Combination Single Stroke and Mechanical Bells are also adapted for fire signals. They are made in 6", 8", 10" and 12" sizes.

PRODUCTS

Manually Operated Fire Alarm Systems;

Electrically and Mechanically Operated Fire Alarm Systems;

Vibrating and Single Stroke Bells for Direct or Alternating Current;

Combination Electrical and Mechanical Bells;

Aluminum Grids to fit all sizes of bells;

Steel housings for all sizes of bells.

THOMAS-SMITH FIRE ALARM SYSTEM FOR SCHOOLS

(Illustrated at Right)

This manual fire alarm system for schools is approved by architects and conforms with state codes. It is the only system having a rigid rod connecting the alarms on the different floors of the school building. Other constructive features are:

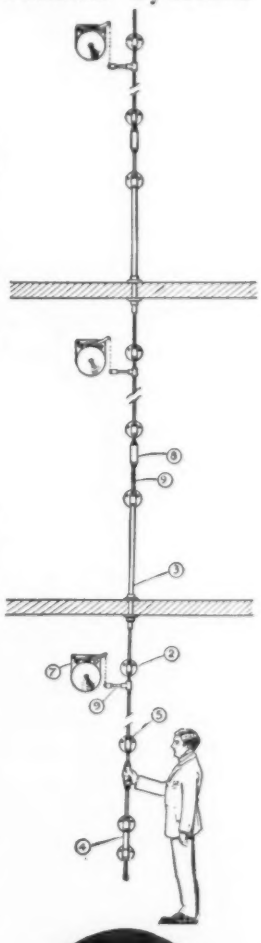
1. Supports are adjustable to take care of uneven walls or misalignment of succeeding floors.
2. The floor tube is adjustable, to allow for floors of various thicknesses, and it extends up from the floor to prevent any obstruction in operation.
3. The spring is totally enclosed and positive in action.
4. All supports and tubes are bushed with brass, lacquered.
5. Finish is enamel. Colors, red, black or buff.
6. The bells are the best made.
7. The handles are of polished brass, lacquered.
8. The operating rod is a continuous steel tube, operating gongs on all floors simultaneously.
9. Wood mats are supplied for mounting supports and gongs.

Combination electrical and mechanical bells can be furnished with above fire alarm systems for operation with electrical ringing systems.

THOMAS-SMITH LIBERTY BELLS

Thomas-Smith Liberty Bells cover all types and sizes from 4-inch to 20-inch, vibrating or single stroke, 110 volt, 220 volt, all standard transformer voltages, battery operation, direct or alternating current. Weatherproofed types are furnished if desired at a small additional cost. All Thomas-Smith Liberty Bells embody the very finest workmanship and materials. Thomas-Smith Aluminum Grids are made to fit all sizes of bells. They fit snugly at the base of the mechanism over the shell and are bird-proof.

Write for catalog of Thomas-Smith Fire Alarm Systems and Liberty Bells.



LIBERTY SINGLE STROKE BELLS, Nos. 12 A. C. and 11 D. C. Made in 5" to 14" sizes. Bells contain no springs nor moving parts except plunger.

WARREN TELECHRON COMPANY

Manufacturers of Telechron Timekeeping Equipment

GENERAL OFFICE AND FACTORY

Ashland, Mass.

DISTRIBUTORS AND REPRESENTATIVES IN PRINCIPAL CITIES

In Canada: Canadian General Electric Company, Ltd., Toronto, Ont.

Telechron

TRADE-MARK

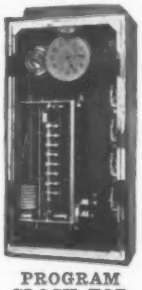
DOUBLE-FACE METAL CASE WALL MODEL

The Modern Timekeeping System for Schools

Telechron timekeeping equipment for schools includes classroom clocks, program clocks, combination signal boards, signal equipment and central control equipment for system installations.

All Telechron clocks are complete individual timekeepers and can be installed as individual devices or in a system on a separate wiring circuit.

All equipment operates directly from the 110 volt a.c. lighting current, the frequency of which directly controls their accuracy; . . . no local master clock to adjust, wind, or clean;* 110 volt current operation practically eliminates line losses and wiring problems; powerful self-starting individual synchronous motor-drive in each device prevents scattering; unaffected by dust, dirt or vibration; no batteries to service or replace; no clock relay complications. The largest single clock installation in the world operating from a single source of power is Telechron!



PROGRAM CLOCK FOR OPERATING CLASSROOM, CORRIDOR AND OUTDOOR SIGNALS

ROUND METAL CASE CLASSROOM TELECHRON

* By means of a Telechron Master Clock installed in the local power company station, regulated frequency is available for the accurate operation of Telechron timekeeping equipment.

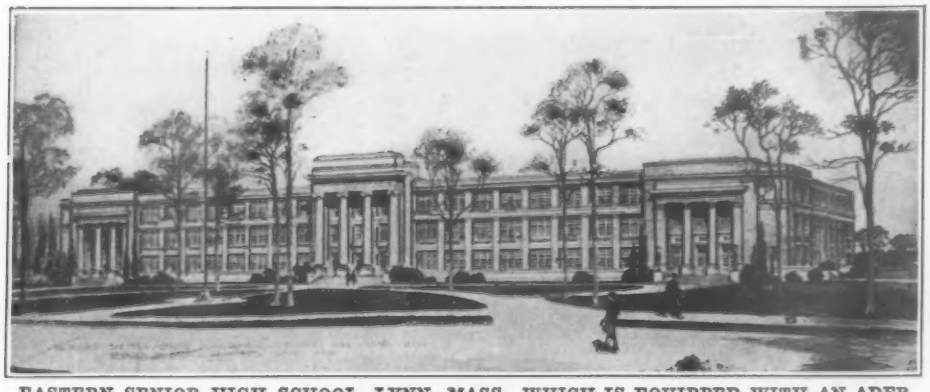
MARBLE CLOCK FOR AUDITORIUM, FOYER, ETC.

COMPLETE SPECIFICATIONS AND RECOMMENDATIONS TO COVER YOUR PARTICULAR REQUIREMENTS WILL BE SUPPLIED BY YOUR LOCAL TELECHRON DISTRIBUTOR OR BY THE FACTORY . . . NO OBLIGATION

AUTOMATIC RESETTING DEVICE FOR CONTROLLING ADMR (AUTOMATIC DUAL MOTOR RESETTING) CLOCK SYSTEM

COMBINATION SIGNAL CONTROL BOARD FOR INDIVIDUAL CLASSROOM SIGNAL CONTROL

** Telechron is the trade-mark, registered in U. S. Patent Office, of Warren Telechron Company.*



EASTERN SENIOR HIGH SCHOOL, LYNN, MASS., WHICH IS EQUIPPED WITH AN ADFR (AUTOMATIC DOUBLE-FREQUENCY RESETTING) TELECHRON CLOCK SYSTEM CONSISTING OF 88 CLOCKS, A PROGRAM CLOCK AND CENTRAL CONTROL EQUIPMENT

Section III

MAINTENANCE AND SUPPLY-HANDLING

A Successful Method of Handling School Supplies

By CHARLES LEE BARR

Assistant Supply Commissioner, Board of Education, St. Louis, Mo.; Past President, National Association of Public School Business Officials

A SUCCESSFUL method of handling school supplies can be defined as a method which makes it possible to carry out satisfactorily and economically the aims of the course of study and school laws of the city or community in question. The system used in St. Louis, similar in general, I understand, to that used in Pittsburgh and Louisville, is in my opinion about the shortest and most practical one for a large system that could be used. Before describing it, it may be well to say a word about the St. Louis public school system.

Everything offered pupils in the St. Louis public schools is free, from the kindergarten through the high schools, teachers colleges, and vocational or trade schools. Parents may pay taxes but pupils are not required to spend a penny on their public education. Corner stores selling to pupils from authorized lists are extinct.

The Size of the School System

The Board of Education operates in its system approximately 150 educational units, among which are two teachers colleges; two vocational schools; eight senior high schools; one intermediate school; 110 elementary schools; a number of special schools and classes; and an educational museum, with delivery facilities, second to none in the United States. To carry on this work requires the services of more than 3,000 teachers during the day, 642 in the evening, and 1,260 for the summer schools. The enrolment in the day schools is more than 100,000, in the evening schools more than 20,000, and in the summer schools it was more than 25,000 last summer for the regular schools and more than 25,000 on the public school playgrounds.

Administration

The St. Louis Board of Education spends approximately $15,000,000 each year, and its funds are raised on a tax rate of only 85 cents on $100. St. Louis builds its fine school buildings out of current revenue without the aid of bond issues; has practically no school debt; and shows a daily bank balance of approximately $5,000,000.

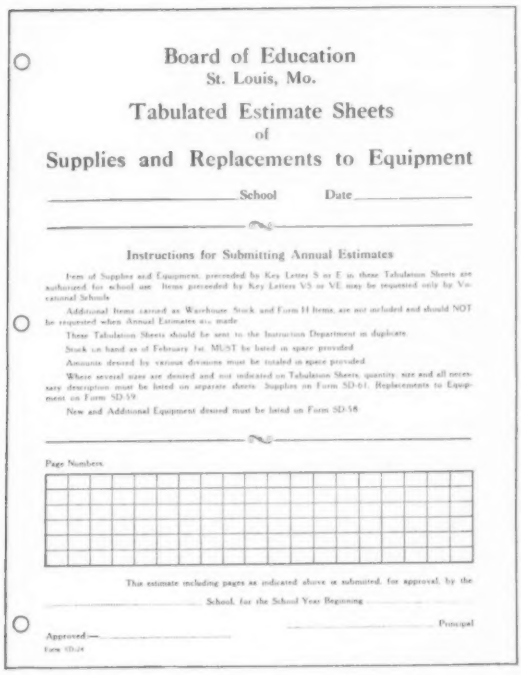
The progress and extension of the St. Louis public schools are largely due to the plan of administration in effect since 1897, when the charter under which the Board now operates was granted by the State Legislature. Under this charter the Board of Education consists of twelve popularly elected members, who are given full authority and responsibility for the administration of the schools. All executive and administrative work requiring expert knowledge and detailed information is performed by the Board's officers—the Superintendent of Instruction, Commissioner of School Buildings, Secretary-Treasurer, Auditor, Commissioner of Supplies, and Attorney, six independent executive officers in all.

With this organization it is natural to presume that a well-defined system of purchase, storage and delivery of supplies must be established to carry on the important work of public education in St. Louis. Under our rules the Superintendent is responsible for the standardization or listing of all supplies needed in connection with the courses of study. The Supply Commissioner is responsible for purchasing, storing and distributing to the schools such authorized supplies as have been listed.

The methods pursued in this line of work can hardly be compared with the methods employed by large firms or corporations in purchasing and contracting, although the buying should be comparatively as close. The Missouri State Charter provides that all supplies for use in the schools for a fiscal year be listed and contracted for annually. There is also a clause in the charter which provides that *emergency purchases* may be made as needed in amounts not exceeding $50 in value. In telling this necessarily brief story of procedure I will endeavor to take up the various steps in their scheduled order.

Preparation of Estimates

Each school is provided with a standard authorized list of supplies and equipment arranged by classification of school departments and numbered. Estimates are due in the Supply Depart-



Board of Education
St. Louis, Mo.

Tabulated Estimate Sheets
of
Supplies and Replacements to Equipment

_____ School Date _____

Instructions for Submitting Annual Estimates

Items of Supplies and Equipment, preceded by Key Letter S or E in these Tabulation Sheets are authorized for school use. Items preceded by Key Letters VS or VE may be requested only by Vocational Schools.

Additional items carried as Warehouse Stock and Form H items, are not included and should NOT be requested when Annual Estimates are made.

These Tabulation Sheets should be sent to the Instruction Department in duplicate.

Stock on hand as of February 1st, MUST be listed in space provided.

Amounts desired by various divisions must be totaled in space provided.

Where several sizes are desired and not indicated on Tabulation Sheets, quantity, size and all necessary description must be listed on separate sheets. Supplies on Form SD-61. Replacements to Equipment on Form SD-59.

New and Additional Equipment desired must be listed on Form SD-58.

Page Numbers

This estimate including pages as indicated above is submitted, for approval, by the _____ School, for the School Year Beginning _____

Approved— _____ _____ Principal

Form SD-24

BOARD OF EDUCATION
ST. LOUIS, MO.

ESTIMATE OF
SUPPLIES AND REPLACEMENTS

PAGE 68

FOR YEAR BEGINNING _____ FROM _____ SCHOOL _____

CAT. NO.	ARTICLE	STOCK ON HAND AT DATE	UNIT	DIVISIONS A	B	C	D	E	F	TOTAL
E 2372	PIPE CUTTERS, ¼ to 1" pipe		each							
E 2373	DIVIDERS, wing, 10"		each							
E 2374	PINCH DOGS 1"		each							
	1½"		each							
E 2375	DRESSERS, emery wheel, diamond point, ¾x10"		each							
E 2376	DRIFTS, automatic drill, No. 1A		each							
E 2377	DRIFTS, drill, plain No. 1		each							
	No. 2		each							
	No. 3		each							
	No. 4		each							
E 2378	DRILL HOLDERS, sleeve No. 2		each							
	No. 3		each							
E 2379	DRILL HOLDERS, for straight shank, Nos. 1 to 10		each							
E 2380	DRILLS, bench, double spiral, ⅛ to ½"		each							
E 2381	DRILLS, breast, round shank, 0 to ½"		each							
E 2382	DRILLS, hand, 0 to ½"		each							
VE 2383	COUNTERBORE, GRUBS, interchangeable, 0 to 4		each	List sizes desired on Form SD-59						
VE 2384	COUNTERBORE CUTTERS, taper, 0 to 4		each	List sizes desired on Form SD-59						
E 2385	DRILLS, twist, letter size, carbon steel, A to Z		each	List sizes desired on Form SD-61						
VE 2385	DRILLS, twist, letter size, high speed, A to Z		each	List sizes desired on Form SD-61						
E 2386	CARBORUNDUM STICK, 8x1½"		each							
E 2387	FILES, splitting		each							
E 2388	FLASKS, steel, (2½x13"—3" deep		each							
E 2389	FLATTERS, handled, 1¼" square		each							
E 2390	FLUX, soldering		quart							
E 2391	BAR FOLDER, sheet metal 20"—No. 22		each							
	20"—No. 22		each							
E 2392	SEWING FRAMES, for book binding		each							
E 2393	FULLERS, cotton, fitted to anvil ¼"		each							

The special blanks on which estimates for supplies and equipment are made out annually by the St. Louis schools are 8½ x 11 inches.

ment on February 1. They are made out on special blanks provided for the purpose. The schools send their estimates directly to the Superintendent of Instruction who, after due inspection, approves and forwards them to the Supply Department.

Some years ago our Annual List of Supplies contained from 5,000 to 6,000 items, and the Board bought what it needed during the year. While a successful bidder may have had what seemed to be a large contract, he never knew how much would be taken out and was therefore never prepared to furnish some items as promptly as needed. Under our present system the Annual List of Supplies comprises an average of 3,000 items. It will be readily seen that this necessitates a very careful estimate of the actual requirements and eliminates a considerable amount of the guesswork which we formerly had to contend with.

Tabulation of Estimates

The estimates are tabulated on cards which are held permanently on file in the department. Each card represents an item and is made up to cover a period of six years. The cards are 9¼ by 11 inches in size and when completed show at a glance (see the form on p. 112):

1. The total amount of items required by the elementary schools
2. The requirements of each high school by school departments
3. The amounts required by the administrative departments

It can very readily be seen to what valuable use the cards can be put, not only to collate the specifications but to compare the various needs of the schools with each other and with former years' requirements. It takes approximately three weeks to tabulate these lists carefully and see that the items have the proper specifications so as to be sufficiently clear to firms desiring to bid on them.

In connection with tabulating these lists I might say that we do not tabulate items aggregating less than $10, except in certain instances, such as chemicals or special items of laboratory supplies and equipment. The items which are not tabulated on the cards are carefully marked and purchased in the open market at some time before the opening of school. We have found that the cost of advertising, listing the specifications and making up contracts on various small items is excessive. Better prices can be secured by buying them in the open market.

Items Are Arranged for the Convenience of the Bidders

As soon as all lists are completely tabulated, the cards are each given a new number, termed the specification number, and are then rearranged into what might be termed "trade classifications." By trade classification is meant arrangement according to kinds of material into groups such as

the trade is familiar with. For illustration, all hardware is listed alphabetically under the heading "Hardware." Other classifications are handled in a similar manner, so that the prospective bidder has no trouble in locating the items in which he is interested.

After classification the cards are transcribed in specification form and in due time are printed and issued to the trade for consideration in bidding. The specifications are usually off the press by March 17, and the bidders are given about a month's time in which to prepare and submit their bids. The specification book in itself is very complete and is in loose-leaf form so that a bidder has to consider only the pages which contain items he is bidding on. The remainder of the book he can discard. Another feature which tends to make these specifications attractive to the bidder is the fact that the Board guarantees to take from the successful bidder at least 90 per cent and at the most 110 per cent of the amount shown in the specifications. On certain items which are affected by market conditions the Board also agrees to place the order immediately upon confirmation of the contract. This, it can readily be seen, is a great inducement to bidding, since it enables the bidder to quote a lower price and protect himself by making arrangements with factories or whatever parties he may be securing his quotations from.

BID SHEET

FOR FURNISHING SUPPLIES TO THE BOARD OF EDUCATION.

Estimates will be received at the Board of Education Building, 911 Locust Street, office of the Secretary and Treasurer, on or before April 13, 1932, at 2 o'clock P. M.

COMPILED BY
E. M. BROWN
SUPPLY COMMISSIONER
March 17, 1932.

INSTRUCTIONS FOR SENDING IN BIDS

BIDS—DETACH at perforations, special notice to Bidders sheet and pages 1, 2 and 3, in addition to the sheets which contain your bid. After having filled out page 1 carefully, enumerate each page containing your bids in the blank squares on this page, signing page 1 at the bottom. In addition, you will sign each of the sheets containing your bids at the bottom of page (both sides) in the proper place left blank for that purpose.

SUBSTITUTE BIDS—Separate sheets (yellow) will be furnished on request for inserting substitute bids. Whole sheets must be used—not strips.

BID

St. Louis, April 13, 1932.

TO THE BOARD OF EDUCATION OF THE CITY OF ST. LOUIS:

We, the undersigned, herewith propose and agree to furnish to the Board of Education any one or all of the following items that we have priced at the prices set opposite each item on the attached sheets, the page numbers of which are enumerated below.

This proposal is subject to all of the terms of these specifications as printed on pages 1, 2 and 3, and we hereby agree to enter into a written contract to furnish such item or items as may be awarded us and to furnish such security as these specifications require.

LIST OF PAGES WHICH ARE HEREWITH SUBMITTED AND MADE A PART HEREOF.

Special Notice Sheet	1	2	3									

Enclosed find Certificate of Secretary and Treasurer of Board of Education for

$ _____

Bidder Sign here with firm Name, Officer of Company signing, and Address of Company. .....

This bid sheet is one of the pages of the loose-leaf specification book which is prepared annually for bidders.

Securing, Opening and Tabulating Bids

Although the rules of the Board require that all material on which bids are asked be advertised for, we do not depend on newspaper notices. We keep in the office an itemized list of bidders who are interested in bidding on the Board's specifications. They always receive specifications on any article in their particular line of trade which we advertise for.

Bids are publicly opened, usually on the second Wednesday in April. The names of the bidders are read and any bidder present who desires to know the prices his competitors quoted on an item can secure the information by mentioning the item number he is interested in. As soon as the bids are opened, they are referred to the Supply Commissioner for tabulation and inspection.

Each bid must be completely tabulated on blanks especially prepared for the purpose, so that all bids on each item will appear. The tabulation is done by taking each two pages of the specifications and pasting them on a large sheet, ruling horizontal lines out from each item, and ruling enough vertical lines across them to allow for the insertion of approximately 75 bids to the sheet. Completion of this tabulation requires about four days' work on the part of two clerks.

Preparation of Samples

While the bids are being tabulated, the samples which were submitted with them are being prepared by the Supply Commissioner for inspection by the various committees appointed for that purpose by the Superintendent of Instruction or other executive officer. All trade marks, names and labels which identify the manufacturer or person offering the sample are detached so

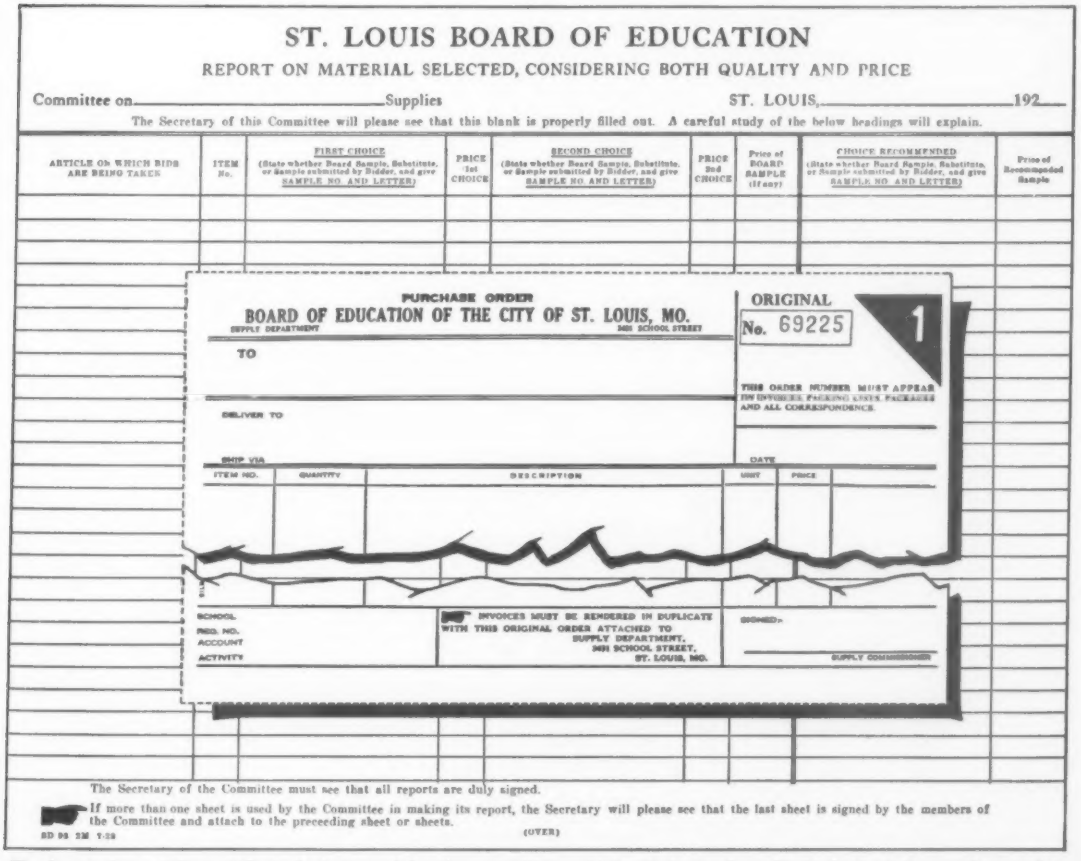
that the committee's opinion shall be based exclusively on the merits of the article without any knowledge as to who offers it. For this purpose the Supply Commissioner marks each sample with a key number, and the committees, in making their recommendations, refer only to these numbers. It is therefore not possible for any member of the committees to know who gets an award until after the Board officially passes on their recommendations. We have found this to be a very successful practice, which serves a twofold purpose: in the first place, it creates confidence in the minds of the bidders that they have an equal chance with all other bidders; and in the second place, it leaves the committee free to work without prejudice of any kind.

The Selection of Samples

Upon the completion of the tabulation and the preparation of the samples, the committees are called together and proceed to make their choices. Their work takes about three days. The committees are appointed each year about a week prior to the opening of the bids. The approximately one hundred members are chosen from the principals, teachers, and supervisors of the school system. As far as possible the personnel of the committees is changed annually, so that a member seldom serves two successive years.

The committees are provided with a blank which they are required to fill out. On the back of the blank is a list of instructions to be followed in the selection of supplies. The instructions ask, among other things, that the committees test each sample on its merits, keeping a record of the results of the tests. In cases where the Board submits a sample to the bidders, the award must be made to the lowest bidder on the Board's sample or on a substitute which shall not exceed in price the lowest bid on that sample.

The committees are instructed to select the best sample offered and also to designate their second choice. After the best samples have been selected and the choice recorded in writing on the blank mentioned above, the chairman of the committee obtains from the Supply Commissioner the prices on all the samples offered, in order to see whether the difference between the prices of the samples selected and that of other samples next in quality is sufficiently great to affect the final selection. This practice enables the



ST. LOUIS BOARD OF EDUCATION

REPORT ON MATERIAL SELECTED, CONSIDERING BOTH QUALITY AND PRICE

Committee on _____ Supplies ST. LOUIS, _____ 192__

The Secretary of this Committee will please see that this blank is properly filled out. A careful study of the below headings will explain.

ARTICLE On WHICH BIDS ARE BEING TAKEN	ITEM No.	FIRST CHOICE (State whether Board Sample, Substitute, or Sample submitted by Bidder, and give SAMPLE NO. AND LETTER)	PRICE 1st CHOICE	SECOND CHOICE (State whether Board Sample, Substitute, or Sample submitted by Bidder, and give SAMPLE NO. AND LETTER)	PRICE 2nd CHOICE	Price of BOARD SAMPLE (If any)	CHOICE RECOMMENDED (State whether Board Sample, Substitute, or Sample submitted by Bidder, and give SAMPLE NO. AND LETTER)	Price of Recommended Sample

PURCHASE ORDER

BOARD OF EDUCATION OF THE CITY OF ST. LOUIS, MO.

SUPPLY DEPARTMENT 3401 SCHOOL STREET

ORIGINAL No. 69225 1

TO

THIS ORDER NUMBER MUST APPEAR ON INVOICES, PACKING LISTS, PACKAGES AND ALL CORRESPONDENCE.

DELIVER TO

SHIP VIA DATE

ITEM NO.	QUANTITY	DESCRIPTION	UNIT	PRICE	

SCHOOL

REQ. NO.

ACCOUNT

ACTIVITY

INVOICES MUST BE RENDERED IN DUPLICATE WITH THIS ORIGINAL ORDER ATTACHED TO SUPPLY DEPARTMENT, 3401 SCHOOL STREET, ST. LOUIS, MO.

SIGNED:

SUPPLY COMMISSIONER

The Secretary of the Committee must see that all reports are duly signed.

If more than one sheet is used by the Committee in making its report, the Secretary will please see that the last sheet is signed by the members of the Committee and attach to the preceeding sheet or sheets.

BD 98 2M 7-29 (OVER)

The larger form (9⅜ x 11⅞ inches) is used by the committees which select samples. Each sheet of the purchase order (7 x 8½ inches), which is made out in quintuplicate, is printed in a different color.

committee to select a sample which may be slightly inferior to the best offered but which may also be serviceable enough and very much cheaper in price.

After the selection is made, the samples, properly wrapped and labeled, are turned over to the Supply Commissioner to be kept intact until the Board has definitely passed on the committees' recommendations. The members of the committees are cautioned not to talk to agents or outsiders about the selections they are making.

The Awarding of Contracts

As soon as the committee reports are signed and approved by the Superintendent of Instruction, the successful bidders are listed with the items that they receive, and the prices at which the awards are made. These lists are then printed and submitted to the Board in galley form, with the recommendation of the Supply Commissioner that contracts be awarded. The Board approves the Supply Commissioner's recommendation on the second Tuesday of May. The contracts are already drawn up and are ready to be mailed to the successful bidders for signature immediately upon confirmation by the Board. After each contract is signed by the bidder, the deposit made by him when the bid was submitted is released and returned to him.

The Board requires bond on all contracts that exceed $2,500 in amount. This bond must be one of a surety company acceptable on contracts of the United States Government, and must amount to 40 per cent of the amount of the contract. The Supply Commissioner may require bond on smaller contracts if he thinks it necessary.

Contracts are made out in triplicate; one copy stays on file in the Supply Department, one with the Secretary and Treasurer of the Board of Education, and the other copy is forwarded to the contractor for his files, after being signed by the proper officers of the Board of Education.

The Placing of Orders

Orders can now be placed at any time for the material as needed. They are usually issued immediately after the signing of the contract, and are made out in quintuplicate. (See the form on p. 110.) Two of the copies are sent to the school to which delivery is to be made, informing it from whom the material is to come; two copies are sent to the vendor or firm from which the purchase is made, one to be kept on file, the other to be returned, attached to the invoice in duplicate; the fifth copy is kept in our own files to check up materials received and to complete our records on ordering.

In St. Louis contracts for school supplies represent approximately $650,000, covered by 130 contractors. Of this amount $400,000 is bulk material, or, as we term it, staple articles for school use, which we immediately order into stock at the Board's warehouse. The stock is then subject to requisition by the schools as needed during the year. We find that stocking the great majority of items places us in a much better buying position in regard to both price and delivery. The balance of the contracts consists of items that are to be delivered direct by the contractor to the various schools or to points of delivery as designated by the Supply Commissioner. The materials sent directly to the schools are principally miscellaneous supplies used in the manual training centers, domestic art centers, special schools, and the laboratories of the high schools. The exception to this is the lumber used in the manual training centers, which is delivered to the Board's warehouse to be inspected and measured.

Invoices Should Be Paid Promptly

It is well to bear in mind that invoices for material delivered should be paid promptly. In fact, there is no reason why a municipal institution should not pay its bills as promptly as any commercial organization. In the Board of Education in St. Louis we have been able to take advantage of all discounts. This practice not only enables us to save a considerable sum but also is responsible for the opinion among the trade that the Board of Education is the best pay and that its money is not only "sure" but "prompt."

The Stocking of Supplies

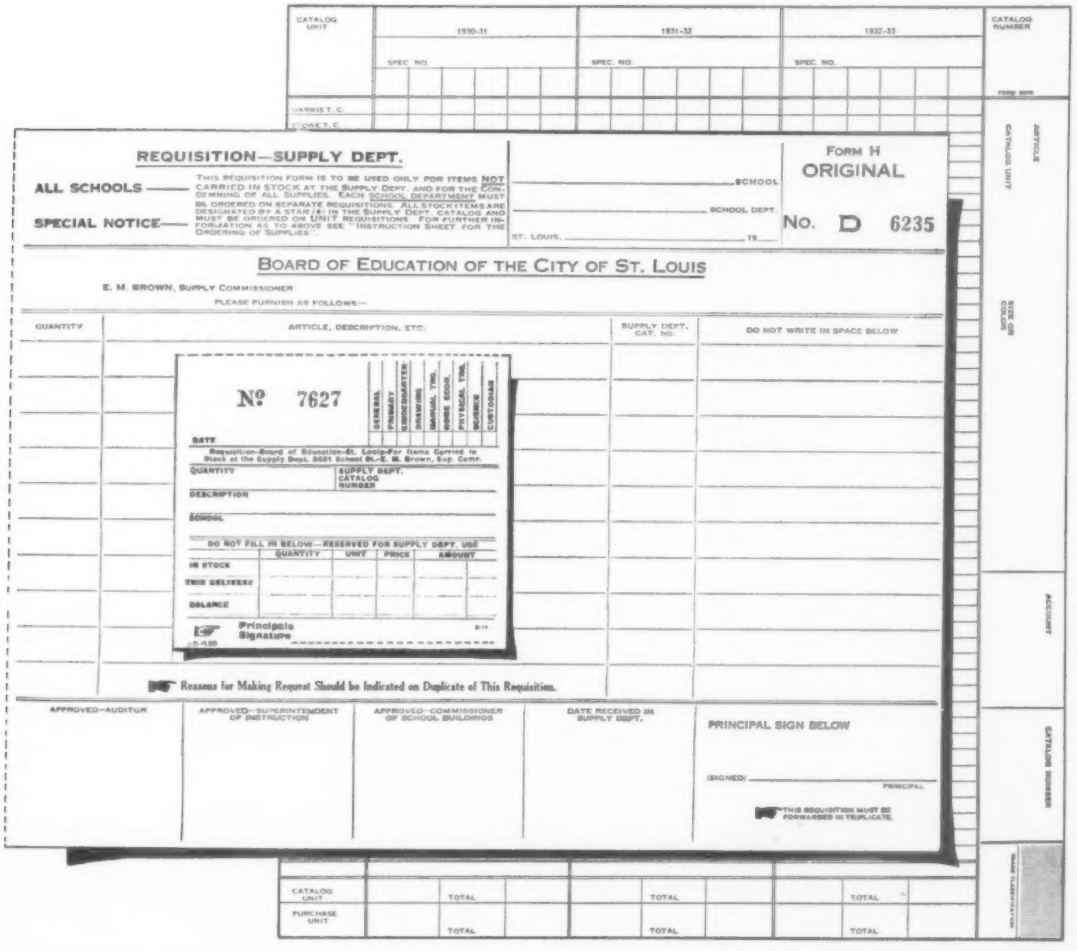
The Board of Education in St. Louis is very fortunate in having a central warehouse or depository, built especially for the purpose of storing school supplies. It is a large modern five-story brick and concrete fireproof building, with a frontage of 172 feet and a depth of 155 feet, built in three sections with fire walls and fire doors between. The building not only serves the purpose of a warehouse in which the various stocks are carried and from which deliveries are made, but is also largely utilized for manufacturing. In it is maintained a bookbindery for the repair and binding of text, reference and library books. The bindery has a capacity of 40,000 books annually and in addition does a great deal of miscellaneous work such as tabbing, blocking, repairing charts and covering loose-leaf binders. There are also large carpenter and paint shops for the manufacture and repair of certain kinds of school furniture and equipment. Other shops are maintained for the electricians, steamfitters and plumbers employed by the Board to do repair work in the school buildings. A garage with a capacity of more than 25 cars or trucks adjoins the warehouse. In it has been installed

all the machinery necessary to care for repairs to the motor equipment.

In my opinion, the ideal warehouse or depository should have the stock rooms on one floor, preferably the first floor above the delivery and receiving platforms. In addition to being used for delivery and receiving, the first floor should be used for the stocking of the heavier and more cumbersome supplies, such as grate bars, boiler tubes, pipe, lumber, oils, etc. The case stock and the reserve stock can be carried in other parts of the building. The freight elevator connecting the floors should be located in the rear of the building where it would not interfere with but rather would facilitate the loading and unloading of supplies.

Classification and Recording of Stocks

In stocking supplies, classification is necessary, so that proper records of costs can be made. We classify supplies in general under the headings Educational, Custodian, and Raw Material. The first classification, Educational, refers to all supplies used directly in the education of the pupil, including books, stationery, and schoolroom, physical training and kindergarten supplies. Custodian indicates all supplies needed and used by a custodian in the operation of his building, such as sweeping brooms, brushes, soaps, dusters and oils. Raw Material means materials used by the Board's mechanics in the repair, maintenance and upkeep of the buildings—hardware, lumber,



The largest of these three forms is a card used to tabulate the estimates of supplies desired by the schools. All the schools in the system are listed at the left, grouped according to kind of school. A separate card is kept for every item on the authorized list of supplies. Both sides of the card are used, providing space for entries covering six years. The card is of thin cardboard, 9¼ x 11 inches in size.

The larger requisition form, 8½ x 11 inches, is made out in quadruplicate (one copy being kept by the school) and is used for items not carried in stock at the Supply Department. For all other supplies the unit requisition system (the small form) is used, in order to eliminate re-orders and to facilitate handling. The requisition form is 3½ x 4 inches and is also made out in quadruplicate. The fourth copy is kept by the school and the other three, which are carbon-backed, are sent to the Supply Department, where one becomes the basis of the perpetual inventory. Filed with a receiving report and an inventory ticket (all the same size), it is kept with the stock card in a unit system cabinet.

paints, plumbing, steam heating and electrical supplies. These various classes of supplies are stocked and accounted for separately.

After stock material is purchased and delivered, it is checked up and placed ready for distribution. When the invoices for the material are received, they are marked with the proper account, entered in the stock book and approved for payment. Accurate stock records kept on each item enable the department to tell at any time the amount of stock purchased and when it was purchased, the amount delivered and to whom delivered, and the balance remaining on hand daily. These records are kept both in reference to the quantity and to money value. Under the rules of the Board, the Auditor is required to check these stocks semi-annually, and the inventory shown must be the difference between the total purchases and the total distribution as shown by his books. The cost of the average daily stock carried in our warehouse is approximately $150,000. This is of course larger during the months of July and August, when it runs up as high as $250,000. Considering that our entire annual purchase of supplies is approximately $700,000, this amount of daily stock is normal.

We have found it advisable to carry a surplus of staple articles used regularly in the schools to take care of their wants at the beginning of the school term. This is done to obviate any serious inconvenience which might be caused by delay in receiving the stocks from the contractors during the summer months. Not infrequently large items of paper and other supplies are delayed in delivery until as late as November, and the stocks on hand at the end of the school year are too low to care for the needs of the opening term. As a general rule, however, immediately upon the letting of the contracts in the month of May, we order into stock for delivery on July 1 all regularly used staple articles. Prior to the close of the school term the principal of each school is required to forward to the Supply Department requisitions for supplies covering his needs for the first five weeks of the ensuing term. This enables us to deliver the material during the months of July and August.

Distribution and Delivery

From an economic point of view, it is necessary to have a delivery service which can care for the wants of the schools and at the same time not be too heavy a drain on the overhead cost and maintenance of the department. During the school term supplies are delivered to the schools every ten days. These deliveries are made at stated periods by districts. The principals are required to make their requisitions on the department at stated times, approximately five days prior to the time specified for the delivery of their supplies. Further, whenever necessary, emergency requisitions are cared for by special delivery. The practice of sending in emergency requisitions should, however, not be encouraged, since it frequently discommodes a well-regulated system run on a minimum of man-power and delivery service. A further exception to the rule is that raw material supplies needed for repairs to school buildings are delivered immediately upon receipt of the proper requisition from the Commissioner of School Buildings. It has been found impossible to have regular delivery dates for requisitions of this nature, since a large number are emergency orders and need prompt attention.

We have found that with frequent deliveries and a close inspection of the stock of supplies carried in the schools, the stock in the schools can be held to a minimum, thereby making it possible to keep a larger stock in the warehouse for wider distribution.

Requisitions

The question will probably be asked at this point, How is the stock requisitioned by the schools? All items carried under the general heading of Educational supplies are subject to direct requisition by the Superintendent of Instruction, the principal or acting principal of the school. Custodian supplies and furniture are subject to requisition by the Commissioner of School Buildings, principal or acting principal, or custodian of the school. Raw materials used for repair purposes are subject only to requisition by the Commissioner of School Buildings. (Two of the forms used are shown on p. 112.

When a requisition is received by the department, it is turned over to the stock clerk to be filled, packed and delivered at the proper time. Itemized receipts accompany the deliveries and are signed by the person receiving the material. These signed receipts are returned to the department, invoiced and charged to the school at the cost of the material. The monetary value of the supplies covered by these receipts are classified and abstracted and a report rendered to the Auditor of the Board by the department once each month, showing the month's charges against each school. A further report is made to the Board at each month's meeting by the Supply Commissioner, showing the total purchases, deliveries and stock on hand in the warehouse for the fiscal year up to the end of the month preceding the meeting of the Board.

Cooperation with the Superintendent

For thirty-four years the St. Louis public schools have been operated on the independent department system, and in that time no dissension or lack of cooperation worth speaking about has developed. The conclusion seems inevitable that a well-organized, efficient corps of independent officers can prove not only a benefit to a Board of Education representing the people, but it can also make the path of the Superintendent smoother and render him more valuable in his chosen field—that of educational policies.

The Maintenance of Clean and Sanitary School Plants*

ESTHETIC considerations justify keeping school buildings sanitary and clean. Health considerations make such a procedure essential. The cleaning of classroom floors is a major division of this service. Corn brooms, which were always more effective for stirring up dirt than for removing it, have been replaced by floor brushes and modern vacuum-cleaning apparatus. . . .

Installation of Vacuum-Cleaning Equipment

If central vacuum cleaners are to be used for cleaning school buildings, their installation must be such that the systems will work successfully. In a school building, as in a hospital or a hotel, they must operate with a minimum of noise. The success of vacuum-cleaning systems in schools and the attitude of janitors toward such a system will depend to a large degree upon the kind of vacuum equipment bought and the way it is installed.

The number of inlet valves and their placement is important. Nothing will make the work of vacuum cleaning so laborious as an insufficient number of inlet valves, necessitating the use of a long hose. There should be an inlet valve in every room near the front or back entrance, or, better yet, in the center of one end of each room.

Both piping and inlet valves may be installed in buildings during the process of construction more efficiently and at less cost than in buildings that have been completed. For this reason every new building should be piped for the central vacuum system, even if the cleaner is not installed immediately.

The Use of Floor Brushes

When a floor brush is used, it is important (1) that floors be cleaned with sufficient frequency; (2) that they be cleaned at such times that the work will not interfere with the educational program of schools (yet janitors will be allowed sufficient time for its effective performance); (3) that a cleaning tool be used which will accomplish effective work; (4) that there should be such conditions of building and equipment that the work will be facilitated; (5) that the floors be treated properly to make effective work possible; and (6) that the best methods of procedure be used in sweeping. . . .

The effectiveness of sweeping depends to a large extent upon the kind of brush or other tool that is used. The best brushes are made of a good quality of Russian or Chinese bristles, sometimes with horsehair out-bristles. They cost about twice as much as fiber or hair brushes, but they are better than fiber and hair brushes because the bristles spring back into their proper position. This helps to clear them of dust during the process of sweeping. With fiber or hair brushes, much dust is retained at each stroke and given up at each succeeding stroke by the brush at the place where it strikes the floor. Real bristle brushes last much longer than brushes of poorer grade.

Brushes should be kept clean and in good condition to give effective use. A clean brush, with a handle securely fastened to the block, and with hairs or bristles that are kept apart, will accomplish better results than one that has not received proper care.

Treatment of Floors for Sweeping

Floors are treated in order to keep dust from rising during the sweeping process; to preserve the wood from wear or from the necessity of frequent application of water; and to improve their appearance.

Oiled floors can be swept more effectively, and probably more rapidly, than unoiled floors. In observations that were made, the average time required to sweep 33 classrooms, the floors of which were unoiled, was 9 minutes 52 seconds. The average time required to sweep 129 classrooms having oiled floors was 8 minutes 17 seconds.

The quality of results in these observations was graded on a five-point basis from excellent to very poor. The average quality grade for the results accomplished in sweeping 33 unoiled classroom floors was 4.3, or between very poor and poor; while the average grade assigned to the results of sweeping 129 oiled classroom floors was 2.0, or good. The difference was largely or wholly due to the difference in the amount of dust that arose from the floor in sweeping. Where floors are oiled well, practically no dust can be observed to rise. Where they are unoiled, clouds of dust, as a rule, soon fill the air of the classroom.

We must conclude, therefore, that sweeping may be done more effectively when floors are oiled and that they must be kept well oiled. This does not mean that there should be a surplus of oil which will cause the floor to appear black, but that floors should be oiled lightly and frequently. The necessary frequency of oiling will depend upon the quality of oil used, the kind of floor, and the condition of the playground and streets.

Scrubbing and Mopping

Scrubbing and mopping are entirely different operations. Scrubbing is the more thorough proc-

* Excerpts from "The School Plant—Its Construction, Equipment, Maintenance and Sanitation," one of the reports of the White House Conference on Child Health and Protection, soon to be published by the Century Company.

ess and implies the use of a scrubbing brush to remove the dirt that adheres closely to the floor. Mopping is merely using a wet cloth or cord mop to remove loose dirt and dust that has not been removed by sweeping or scrubbing. Each process has its place in the care of school-building floors and neither can be a satisfactory substitute for the other. In 28 schools that were observed, the median practice was to scrub classroom floors twice a year.

If floors are waxed, they should not be scrubbed. This is one of the principal advantages in having waxed floors. Not only is the wax a good preservative against wear, but by eliminating the need for scrubbing, it is also a preservative against the bad effects of water upon the floor. Where floors are not treated with oil or wax, they should be scrubbed once a month. The need for weekly mopping may be eliminated if a vacuum cleaner is used for daily cleaning. But, in any case, floors should be scrubbed regularly.

Floors of kindergarten and home economics rooms, which should not be oiled nor even waxed if the other floors of a building are treated with oil, must be scrubbed and mopped. If they are injured by the use of water, they must be relaid. Floors of kindergartens should usually be mopped daily, and home economics rooms weekly, supplemented by an occasional scrubbing. Because of the kind of use to which such rooms are put, it is important that the floors be kept very clean.

While wood floors should not be cleaned with strong solutions of oxalic acid, lye, and the like, weak solutions of cleanser should be used to remove permanent dirt. Soap chips make a solution that will remove dirt, if mechanical means are used, without injury to the wood. If stronger cleansers are used, such as prepared cleaning powders, only a minimum should be used.

Oiling and Waxing Floors as a Means of Eliminating Dust from the Air

Oil and wax are floor preservatives. They are also essential for maintaining healthful conditions in schoolrooms. Both prevent dust and disease germs which fall to the floor from rising again and being breathed by the children. These foreign substances adhere to oil but are held to the wax surface by means of magnetism.

The most common practice in oiling floors of school buildings is to oil them twice a year. Twenty-eight schools studied by Reeves and Ganders followed the practice of oiling floors three times a year. A study of the requirements in rules and regulations for janitorial services shows the median requirement for oiling floors to be twice a year. These practices and requirements applied to the floors of rooms, corridors, and stairs.

Classroom floors should be oiled or waxed at least three times per year. The oil on corridor floors, aisles and stair treads can be renewed in the interim by using a good sweeping compound.

The result of waxing or oiling a clean floor will always be superior to that of waxing or oiling a dirty floor. Observations of the floors of school buildings show that the floors presenting the worst appearance were those that had not been scrubbed but had been oiled three times a year with an oil containing vaseline. If floors are not cleaned, the oil previously applied will hold dirt and thus prevent the new oil from soaking properly into the pores of the wood. If an oil containing vaseline is to be used, the floors should be thoroughly scrubbed prior to the application of new oil. If an oil containing paraffin is to be used, the oil may contain a cleaner, or the floor may be cleaned with kerosene before the new oil is applied.

To insure ready absorption of the oil, it is essential that floors should be not only clean but also perfectly dry when the oil is applied. The necessity for cleanliness applies with equal force to floors that are to be waxed. An unclean floor will appear spotted or black through the wax. As has been shown previously, waxed floors should not be cleaned with water and soap.

Protection of Child Health by Efficient Dusting of School-room

The dusting of the rooms of a school building is very important from the standpoint of the appearance of the building and the comfort of those who use it. Of greater importance, however, is its effect upon the health of pupils and teachers. Dust in school buildings may be caused from using chalk, and from the grinding of cement floors under children's shoes. Some dust may blow into the building from the street through open windows or doors. But most of the dust is from the dirt carried into the building from the street, playground, or home, on children's feet.

Dust in the air in a schoolroom irritates the eyes and respiratory tracts. The dust that settles on desks and books may be transferred by the hands to the delicate membranes of eyes, nose, and mouth. The dangers arising from the dust of school buildings, and especially classrooms, make its elimination with the germs it carries an extremely important phase of school-building operation.

It is impossible to eliminate all dust. Much of it, however, can be prevented if proper precautions are taken. Following are a few suggestions for preventing much of the dust usually found in school buildings:

1. The playground should have a sand or loam surface worked into a clay base and should be well drained.

2. Footscrapers and good doormats should be placed at all entrances, and children should form habits of using them.

3. The air intake should be high enough from the ground to avoid drawing dust into the building.

4. The plenum-fan room should be kept free from accumulations of rubbish and waste, should be provided with an air washer or air filter, and should be cleaned regularly.

5. The furnace room should not be directly under the building, but if under the building, the furnace-room doors should fit tightly and should be kept closed.

6. Windows should fit tightly.

7. Cement floors of corridors, playrooms, toilet rooms, and the like, should be painted to eliminate dust which would otherwise be caused by the grinding of the cement under the children's feet.

8. A central vacuum cleaner will eliminate the greater portion of dust—both in the air and on furniture—due to daily cleaning of floors.

9. The proper use of a good grade of light oil and of sweeping compound is important where floors are cleaned with a brush.

10. The floors should be solid so as not to spring when children move about the room.

11. The boards of the floors should fit together tightly so that there will be no cracks to retain dust.

12. Water should be used sparingly on wood floors, and when the floors are scrubbed they should be dried quickly to avoid cracks and checks which will hold dust.

13. A medium-hard crayon should be used in schools. It should not be so soft that it will produce a great deal of dust, nor so hard that children can read only with difficulty what is written on the blackboard. Crayons should rest on a wire screen over chalk trays.

14. The dusting process itself should remove dust, rather than merely stir it up.

Dusting School Furniture

The most important dusting job, in view of its relationship to the health of school children and the time required for its performance, is the dusting of school furniture. If janitors neglect this work, the children must use dusty desks or the teachers must keep dust cloths in their desks and perform the work themselves. The work of dusting school furniture is distinctly a janitorial job and should not be expected of teachers.

After considering experimental data on procedures for dusting, it has been generally conceded that a feather duster or a rough towel should not be used because either stirs up the dust, which quickly settles on the object again. A soft cloth or a sanitary duster will give good results, but dusting with a sanitary duster requires less time. Dusters should be treated very lightly with a good grade of oil, furniture polish, or kerosene. Only one duster should be used, and only one row of desks and seats should be dusted at each trip through the aisles. From the standpoint of both quality of results secured and time required, the back-and-forth method is preferable to the circular, or to the flipping method. The furniture of classrooms and special rooms should be dusted every day, in the morning before the children arrive.

Clean, Sanitary Toilets Essential for Health Protection

No work included in plant operation for health protection is more important than the proper care of toilets. The work is not difficult and does not require a great deal of time, but it must be performed frequently, regularly, and thoroughly if toilet rooms are to be kept clean and the school building kept free from odors. Some data have been gathered concerning how often janitors clean toilet rooms. Harshfield found that in twenty-nine school buildings the cleaning of toilet rooms ranged from daily to once in two months. In thirteen buildings they were cleaned daily.

Garber found that in 503, or 51 per cent of 987 cities reporting, toilet rooms were cleaned daily. In 268, or 27 per cent, they were cleaned weekly. The range was from daily to yearly. It is surprising that in eight cities toilet rooms were cleaned only once a year, and in eight others but from two to six times a year. Toilet rooms cannot possibly be kept clean with such infrequent attention. One wonders how it is possible to hold school in buildings where toilet rooms are cleaned but once or a few times a year.

In twenty-eight schools visited by C. E. Reeves, the cleaning of floors of toilet rooms ranged from four times a day to weekly, the median practice being daily. The same ranges and medians were found in an analysis of thirty-nine sets of rules and regulations of boards of education. In twenty-six other rules it was stated that toilet rooms should be cleaned "as often as necessary" or "as directed." Such requirements mean very little. There is no reason why definite specifications stating how often toilet rooms should be cleaned cannot be stated, as well as for other cleaning work.

Toilet rooms located on first and basement floors should, because of their greater use, be cleaned several times a day. Children rush to toilets after each recess period and in the mornings and at noon just before the beginning of school sessions. Under some conditions cleaning the toilet rooms should be performed after each of these periods.

The required frequency of cleaning will depend, of course, somewhat upon the size of toilet rooms, the number and ages of children using them, the amount of ventilation secured either by special ventilating systems or by windows, and the amount of sunlight entering toilet rooms. Daily cleaning should be the minimum standard, with more frequent cleaning where conditions make it desirable. Data indicate that daily cleaning is practiced in approximately 50 per cent of school buildings.

Where daily cleaning is practiced, there should be more thorough cleaning weekly. If floors are *mopped* daily they should be *scrubbed* weekly. Sweeping is of little value in cleaning toilet rooms. It will not clean them nor dispose of germs. It is necessary to sweep only when so much dirt has been carried into toilet rooms that they cannot be mopped until they have been swept.

Lavatories should be cleaned daily and mirrors should be washed weekly. Woodwork, walls, and ceilings will need cleaning three times a year, and the partitions may need cleaning at least

monthly. Marks should be removed as soon as discovered. Chains, handles, and doorknobs should be cleaned and disinfected weekly. Janitors should give attention to the ventilation of toilet rooms after each entrance of pupils unless a fan is kept in operation throughout the day.

The flow of water into toilet bowls and urinals and from faucets should receive daily attention and all drains should be inspected daily. Drains that are out of order should be mended as soon as discovered. Toilet paper, towels, and liquid soap should be supplied wherever needed.

The Need for a Woman Assistant

If toilet rooms are to be cleaned daily during school hours, it will be necessary that one or more women assistants be employed on the janitorial force. Women assistants are needed also to supervise girls' toilet rooms during recess periods. If there are no women assistants, the cleaning of girls' toilet rooms must be left until after school hours. This is not satisfactory, because the need for cleaning occurs during the day and because the janitors do not have sufficient time for the work after school when every minute should be given to the cleaning of classrooms. Superficial cleaning of both toilet rooms and classrooms will result if toilet rooms are left for cleaning after school.

Agents Used for Cleaning Toilet Rooms

Unlike the cleaning of wood floors and furniture, where very weak solutions of cleansers must be used, most of the cleaning of toilet rooms should be done with very strong solutions.

Floors.—Toilet-room floors should always be of impervious materials, such as tile or hardened and painted cement. For cleaning such floors a strong solution of Gold Dust, Dutch Cleanser, Babbitt's, Bon Ami, or similar cleanser should be used. Oxalic acid may be used without detriment. Very hot water should be used in making cleaning solutions, and a little ammonia and a good disinfectant, as nearly odorless as possible, should be added.

Porcelain.—As a rule, the same kind of cleanser should be used for cleaning toilet bowls, urinals, sinks, and lavatories as is used for cleaning toilet-room floors. Some good cleansing powder and disinfectant in hot water should be used. It should be strong, but not as strong as for cleaning floors, because porcelain may be injured by very strong solutions. If oxalic acid is used, it should be used in limited amounts.

Drain Pipes.—Prepared drain-pipe cleaners may be purchased for the removal of materials that may clog them. A little of the cleaner is poured into the drain and left for a time to dissolve organic matter, such as grease, soap, rags, paper, and the like. Water is then run through the clogged pipe and the material is washed away. The cleaners should be of such a nature that they will not injure the metal or porcelain with which they come in contact.

Walls, Ceilings and Woodwork.—Clear water or water with a very weak solution of soap chips should be used for cleaning walls, ceilings, and woodwork in toilet rooms. Strong solutions of cleansers will injure the paint on walls and the finish of woodwork just as in the case of cleaning such surfaces in classrooms.

Disinfectants.—In nearly all toilet-room cleaning, disinfectants should be used. Disinfecting toilet rooms is not an extra job. The disinfectant is merely added to the cleansing solution that is used. Carbolic acid, some form of chlorine, ammonia, lysol, formaldehyde, or bichloride of mercury (corrosive sublimate) is often added to the solution.

A disinfectant should be odorless, or nearly so. Some of the disinfectants mentioned above have odors that will penetrate the building. One good disinfectant is prepared chlorine tablets which can be dissolved in cleaning solutions. Other disinfectants that are not objectionable for their odors, if used in moderation, are ammonia and carbolic acid.

A good disinfectant is a germicide. Disinfectants which are spread over floors, such as chloride of lime, are of very little benefit, because they do not come in contact with all portions of the surfaces. They give off disagreeable fumes that penetrate the whole building. To be effective, disinfectants must be used in liquid form, applied in the cleaning water, in order that all parts may be treated.

Deodorizers are of no value whatever, for they merely cover up one bad odor with another equally bad. Their use makes it difficult to detect the real condition of toilet rooms. The odors from such deodorants are very penetrating and make the atmosphere of the entire building unpleasant. A deodorant merely neutralizes an offensive odor; a disinfectant destroys germs. C. E. Reeves reports seeing in a display of disinfectants a cube enclosed in a metal box, to be hung on the wall of a toilet room. He says "This cube had a very pungent odor but the box was labeled 'disinfectant.' A disinfectant enclosed in a box where it cannot come in contact with germs, is, of course, nothing but a deodorant and its only purpose is to make it impossible to detect the real condition of the room in which it hangs."

Machines for the dispensing of sanitary napkins and receptacles for their disposal should be placed in all toilet rooms used by junior and senior high school girls. When the seventh and eighth grades are housed in elementary schools, the foregoing provision should be made in toilets used by the girls of these grades.

Western Reserve University's Comprehensive Service Building

By A. C. ROBINSON, III

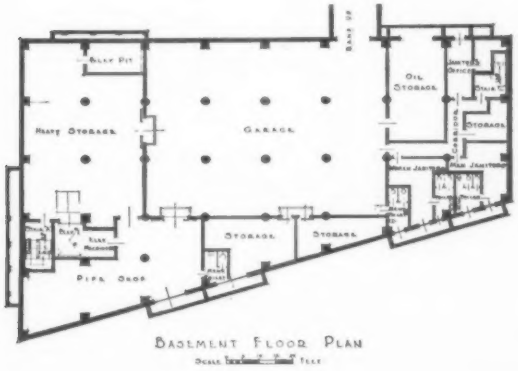
Garfield, Stanley-Brown, Harris & Robinson, Architects, Cleveland

THE Service Building of Western Reserve University in Cleveland, Ohio, was built to house the general maintenance and supply departments of the University, as well as to accommodate a laundry serving the four University hospitals and the University itself. To combine all of these activities in one building and yet keep each department and its employees separate constituted a considerable problem. The laundry, because of the volume of its work, required two whole floors. The ceiling heights had to be greater for the laundry than for the other floors because of the amount of space required for ventilation ducts and gutters under the washers. The carpenter shop required greater ceiling height than the storerooms and had to have special provisions for woodworking machinery. The stores had to be accessible to the public, and the receiving and shipping rooms were part of this department.

The Laundry

The final solution was to put the laundry on the two top floors, the fourth and fifth. A separate loading platform was provided on the first floor, as well as elevators serving the top floors only. Incoming laundry is routed to the fifth floor, where the washing and heavy ironing are done. From there it is sent by chute or by another small elevator to the fourth floor, where the processes of hand ironing, sorting and shipping are carried on.

Sterilizers for hospital laundry are near the receiving room of the laundry. The washers are located so that they are served by an overhead rail, and damp work is finally carried to a sorting table. On this floor the heavy mangles, tumblers and blanket drier are also located. On the floor below is a large ironing room, a separate room for nurses' laundry and sorting, and linen and sewing rooms. Here also are the women's locker room and the offices of the head of the laundry. Finished laundry is shipped by the second elevator to the loading platform. This arrangement of the laundry and its location on the top floors have provided it with excellent light and ventilation. The floors are cement and the walls have a salt-glazed tile wainscot.



Basement Floor Plan

First Floor Plan

THE IRONING ROOM

Shops and Stores

The third floor is occupied by the carpenter and paint shops. The woodworking machinery is here, as are the offices for the head of the maintenance and construction department of the University. The floor is served by a stairway of its own and a large freight elevator which also serves the first two floors.

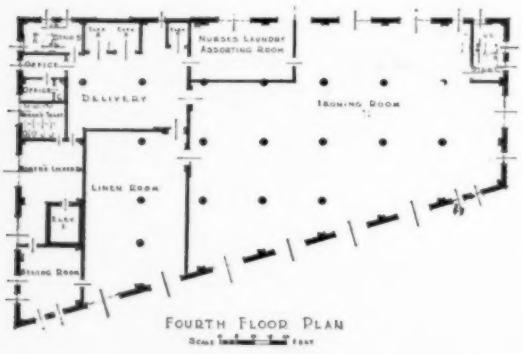
The University stores and supply departments operate on the first and second floors. Ample space is provided for receiving and shipping goods to the various parts of the University. A separate entrance for the general public admits those who come for smaller supplies. A large vault for special supplies is located on the first floor, and the University print shop is on the second.

Storage Space

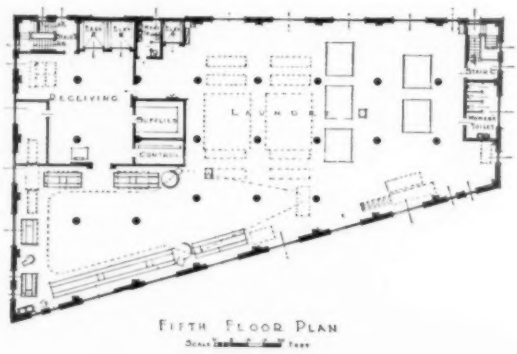
In the basement is the garage for all University trucks and machines. A curved ramp leads from it to the street level. Necessary storerooms for oil and parts are provided in connection with the garage. Also provided are a pipe shop and heavy storage space, both of which have loading platforms in the garage, which is on a lower level. At one end of the basement are the headquarters for the janitor service for the University. There are locker rooms for both men and women and toilets for each. The head of the department has his office here, and there is a storage room for supplies. The department also has a separate outside entrance.

Communication to the various departments has been worked out so that there is no conflict in the operation of the building. The employees of each department, as far as possible, have stairways of their own. The same is true of the elevators. Two elevators serve the laundry only while the freight elevator serves the stores and supplies and the shops.

THE LAUNDRY



FOURTH FLOOR PLAN



FIFTH FLOOR PLAN

Construction

The exterior of the building is of buff brick trimmed with limestone, to conform with the other University buildings nearby. The finish of the interior is extremely simple and serviceable. The building is necessarily a factory type. The weight of the laundry machines as well as the woodworking machinery in the carpenter shop called for heavy construction. The frame is of reinforced concrete throughout, with a tin-pan floor system. The finished cement floors are monolithic. Factory type steel sash were used throughout. The ventilating machinery is located in a penthouse on the roof.

Western Reserve has found that having the maintenance and supply department in one building instead of scattered throughout the University, is an economical as well as efficient arrangement. The Service Building is a modern and workable plant.

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

Clocks and Signal Systems—International Time Recording Co.
Doors, Hollow Metal—Dahlstrom Metallic Door Co.
Drinking Fountains—The Halsey W. Taylor Co.
Exterior Stonework—Indiana Limestone Co.
Fire Alarms—Holtzer-Cabot Electric Co.
Fire Protection Equipment—W. D. Allen Mfg. Co.
Flush Valves—Sloan Valve Co.
Insulation—Celotex Co.
Interior Telephone Equipment—Western Electric & Mfg. Co.
Laundry Equipment—American Laundry Machinery Co.
Lighting Globes—Holophane Co., Inc.
Lockers—Lyon Metal Products Co.
Partitions, Shower and Toilet—The Sanymetal Products Co.
Toilet and Plumbing Fixtures—Standard Sanitary Mfg. Co.
Wrought Iron Piping—A. M. Byers Co.

MAINTENANCE AND MODERNIZATION

These subjects have been covered in previous editions of The American School and University, copies of which are still available, by the following articles:

EDITION OF 1931-1932

Modernizing the School Plant of an Old City
By George Drayton Strayer, Director, Division of Field Studies, Institute of Educational Research, Teachers College, Columbia University

Planning a University from the Operating Point of View
By James M. White, Supervising Architect and Superintendent of Business Operations, University of Illinois

Estimating School Equipment Costs—A Pupil-Station Method
By R. T. Guyer, Principal, Central Junior High School, Muskegon, Mich.

Reducing Electricity Costs for Public Schools
By H. H. Linn, Assistant Superintendent in Charge of Business, Muskegon Public Schools, Muskegon, Mich.

EDITION OF 1930-1931

A State Program of Rehabilitation of Teachers Colleges
By R. E. Tidwell, State Superintendent of Education of Alabama, 1927-29

Organization and Equipment for Upkeep of Buildings and Grounds of a University Campus
By I. W. Truettner, Maintenance Inspector, Buildings and Grounds Department, University of Michigan

School Painting Practice in 174 Cities

Fundamentals of Insurance for School Properties
By John J. Thomas, President, The Lloyd-Thomas Co., Appraisal Engineers

EDITION OF 1929-1930

Modernization of Old School Buildings
By George F. Womrath, Assistant Superintendent of Schools, in Charge of Business Affairs, Minneapolis, Minn.

Problems of Planning Additions to Schoolhouses
By A. W. Merrill, Assistant Superintendent, Des Moines Public Schools

Modern Trends in Schoolhouse Painting and Decoration
By G. B. Heckel, Secretary, American Paint and Varnish Manufacturers Association, Inc.

Functions and Methods of a University Purchasing Department
By George S. Frank, Manager of Purchases, Cornell University

Self-Insurance for Public School Buildings
By Harvey A. Smith, formerly Superintendent of Schools, Millville, N. J.

J. I. HOLCOMB MFG. COMPANY

Draper and Van Buren Streets

Indianapolis, Ind.

EASTERN OFFICE: 437 11th Ave., New York, N. Y.

Products

Cleaning Brushes and Cleaning Chemicals—Floor Brushes, Dusters, Scrubs, Toilet Brushes, Cleansers, Deodorants, Disinfectants, **Floor Finishes,** Polishes, and Toilet Soaps.

The J. I. Holcomb Manufacturing Company is the largest manufacturer and distributor of cleaning brushes and cleaning chemicals. For thirty-six years thousands of customers have been coming to "Cleaning Headquarters" with both their usual and unusual cleaning problems.

Almost 70 per cent of the schools of the country are using Holcomb Cleaning Tools.

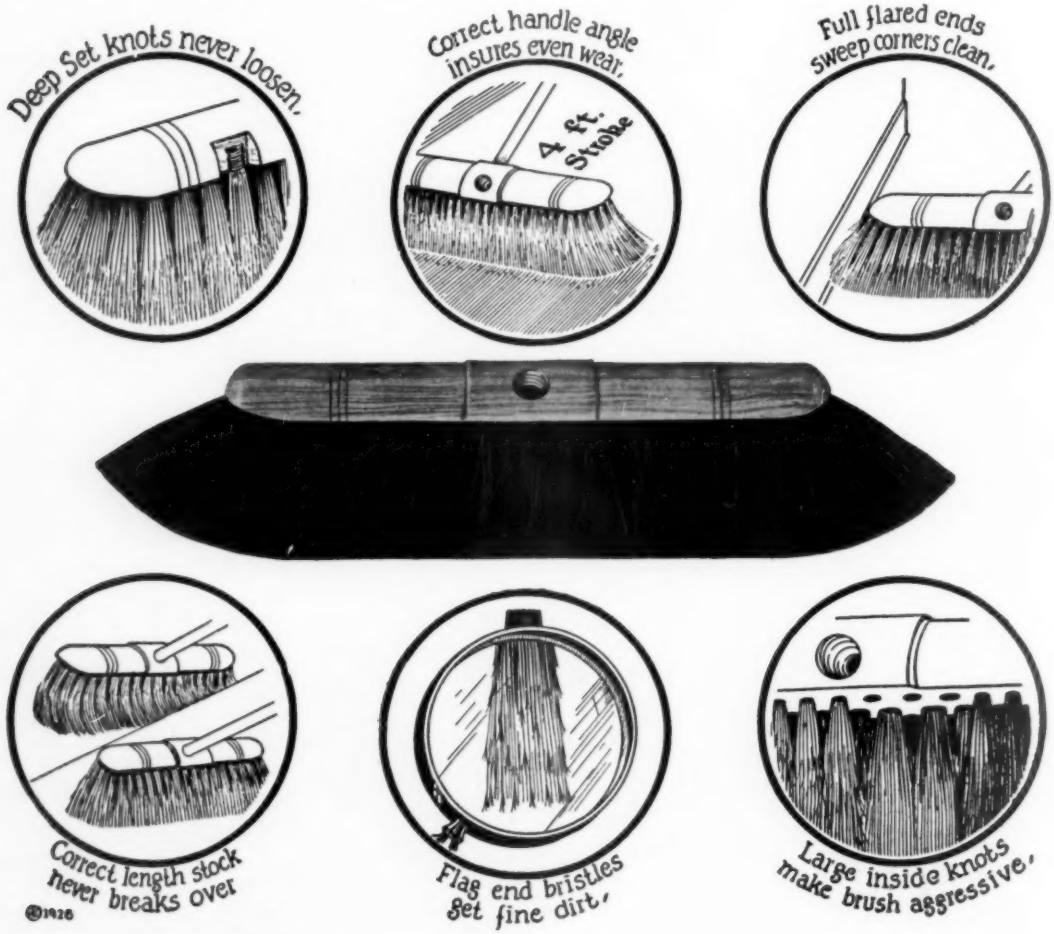
Your Cleaning Costs

"Speeding-up-the-job" is the first thing built into the Holcomb line.

As the labor cost is approximately twenty times the material cost, a 10% saving on the labor makes a profit equal to twice the cost of the material.

Holcomb Floor Brushes

During four to five months of winter, sweeping-time, after the classrooms are vacated, is limited. Holcomb Floor Brushes do the maximum sweeping per stroke with the minimum of labor." "Correct construction cuts cleaning costs"—by speeding up the job.


Deep Set knots never loosen.
Correct handle angle insures even wear.
4 ft. Stroke
Full flared ends sweep corners clean.
Correct length stock never breaks over
Flag end bristles get fine dirt.
Large inside knots make brush aggressive.
©1926

The Care and Maintenance of Floors

By R. A. HOLCOMB, Treasurer of the
J. I. Holcomb Mfg. Co., Indianapolis and New York

The development of competitive floor surfaces during the last decade has made the building manager and maintenance engineer floor conscious. Wood floors predominate today, but the deforestation of America has helped materially to bring forward eight other major types of enduring floor surfaces—both practical in use and artistic in appearance.

These nine major types of floor have been approved and accepted. Today finds millions of American dollars invested in them.

Thousands of acres of these floors are damaged each year through improper treatment. Therefore, we are here giving you our findings from the exhaustive research on the proper conditioning, treating and maintenance of these nine major floor surfaces.

WOOD SURFACE

New and Untreated—Hardwood floors such as maple and hard pine are sometimes maintained by daily sweeping and occasional wet scrubbing or mopping. Such treatment is a step toward correct sanitary floor maintenance. Even though proper materials are used, the greatest disadvantage of this treatment is that wet maintenance tends to raise the grain of the wood, causing it to splinter, crack and warp, which induces dry rot, thereby causing rapid deterioration of the surface.

In wet scrubbing or mopping, we suggest the use of a non-abrasive soluble cleanser.[1] The abrasive cleaner is hard to remove from the surface and speeds up the deterioration of the floor. Soap powders often leave resinous or fatty substances on and in the surface which discolor it.

Where utility of the floor is most important, and the beauty in maintenance only incidental, dry scrubbing with a scrubber with handle and a minimum of wet scrubbing gives long life to the floor surface.

Untreated hardwood floors may be filled and wax maintained when laid (or long after they are laid). If the flooring is quite porous, such as oak and beech, we recommend the use of a paste wood filler before the wax[2] is applied—paste filler not needed on hard maple and pine. Before applying the filler or wax the floor should be thoroughly cleaned with a liquid cleaner.[3] Some prefer sanding for maple floors, but there isn't enough improvement in the appearance of the floor over the liquid cleaner method to warrant the extra expense involved.

The ideal treatment is the use of a product which is a sealer and conditioner combined.[4] It forms a film on the surface which retards the wear of the floor itself. (Apply a paste wood filler first, if floor is porous.) The surface can be maintained indefinitely with the sealer or it can be wax maintained—this maintenance must be regular as every room has its traffic lane where the wear is heavy.

Previously Treated—In reconditioning treated floors it is necessary to have it uniform in appearance and this calls for the removal of the oxidized (darkened) surface.

The floor should be thoroughly cleaned through the use of a liquid cleaner[3] or a soluble powder cleaner[3]—exceptional cases require sanding. Surface should be treated with a sealer and conditioner[4] combined and wax or sealer maintained.

Oil Treating, Either Untreated or Treated Floors—Oil treating costs less per square foot than the hard surfacing method through the use of a sealer and finisher combined, but the maintenance cost is more because of it taking a greater time for the daily clean-up (sweeping). If oil treating method desired be sure to use a floor dressing,[5] which has had most of the oxidizable oils removed from it—it is slow in oxidizing (becoming darker).

TILE SURFACE

Tile is used not only from a utility standpoint, but through it the highest decorative needs have also been met.

In tile maintenance the greatest care is called for—the surface sheen must be maintained. Abrasive cleaners should never be used in daily maintenance—only non-abrasive liquid,[3] soluble sodium[3] or carbonate cleaners.[6] A mop rinse that leaves a film to protect the sheen of the tile itself is preferred by many.[7]

If surface has become stained or discolored, a tile reconditioner[8] can be used with safety—if specific directions as to application are followed.

TERRAZZO SURFACE

Terrazzo is the Italian name for an aggregate of crushed marble chips and Portland cement, which, when hardened, is more durable than marble alone, for the cement petrifies the marble grains and makes an excellent floor pavement, or wall covering.

Maintenance for terrazzo is similar to that given above for tile except that it does not have a high sheen to be maintained. Many building managers wax[9] maintain terrazzo to give it a sheen—the wax being applied s-p-a-r-i-n-g-l-y.

MARBLE SURFACE

Marble is crystalline limestone of various colors which will take a high polish—it has been used for centuries as memorials and in exterior work. An American inventor built a machine which enabled the cutting of marble so it could be economically used for floor and wall surfacing.

The maintenance of marble surface is quite important. Salt solutions (Sodium and Carbonate Cleaners) penetrate the porous floor and then expand, exerting great pressure within the marble. Neutral light bodied soaps[7 and 10] are recommended for marble maintenance.

A limited amount of research on treatments of exterior marble where, after a period of exposure the polish is marred, stained or dulled, has been given with a poultice made by adding about a double volume of water to a paste polish.[11] This poultice should be patted on the space involved and be allowed to stand overnight, then removed and surface polished down. This overnight poultice often eliminates ink, grease and urinal stains. Oil and grease stains should be immediately removed by a gasoline saturated blotting paper—before the stains are allowed to "set." (Do not delay until tomorrow—do it "today.")

CEMENT (CONCRETE) FLOORS

Cement surfaces in bottling or canning plants that may be subjected to spilled milk, syrups, fats and oils, and other industrial products, should be thoroughly scrubbed at least once a day. Use soluble cleanser[1] in mopping water with a stiff scrub brush, after which the floor should be mopped dry.

Garage and power house floors frequently become soiled with mineral and lubricating oils. Often these oils do not have a detrimental effect on the concrete floor, but sometimes they act as a solvent causing the surface to slowly crumble away. The presence of oil always affects the general appearance of the floor, and makes the surface slippery and dangerous. Such floors may be cleaned by first scraping off all thickened oil crusts, and then mopping the floor with a solvent cleaner[12] in kerosene or a grease solvent soluble powder cleaner[1] in water. After as much of the oil and grease as possible is removed, the floor should be thoroughly scrubbed with a liquid cleaner[2] and mopped dry.

A liquid hardener[13] should be applied on dusty, dry cement floors—this "dusty" condition is often due to too rapid drying when the floor was laid.

To recondition painted cement floors that chip or scale all the paint remaining should first be removed with wire scrapers or wire scrubbers. A sealer[4] can then be applied if the cement surface is smooth (not wavy). However, if after removing the paint, the cement has deteriorated and is "dusty" (has loose particles that can be swept away), it should be treated with a cement hardener, before the sealer is applied.

If the surface is "wavy," a contractor should put on a new cement topping, and then the sealer be applied. . . . A sealed cement floor can be wax[9] maintained and it will last indefinitely if the wax is applied **sparingly but regularly.**

COMPOSITION FLOORS

The majority of composition floors are 50% to 100% asphalt in content—they are either of the manufactured tile block type, or they are troweled onto the floor the same as cement.

The pigment (color) in the composition floor varies in its constancy and therefore the cleaning problem is specific and not general in scope. Abrasive or caustic cleaners should never be used.

A light bodied neutral soap[7 and 10] is a standardized preservative agent, for nine out of ten composition floors if the water used as the carrying agent is not too alkaline or hard. **A NEUTRAL SOAP WILL NOT INJURE A COMPOSITION FLOOR THAT THE WATER USED AS THE CARRYING AGENT WILL NOT INJURE.**

Never use an oil solvent wax on composition floors—it will cause the colors to run or "bleed." Use a wax without the hydro-carbon content[14] where a high sheen is desired.

LINOLEUM SURFACE

Linoleum is a material manufactured from linseed oil, ground cork and various gums, mixed and ground fine, then put on a burlap foundation through cylinders at high pressure under varying degrees of temperature—with color pigment impregnated, or on the surface only (printed linoleums).

The care of linoleum has been thoroughly studied by the manufacturers to discover the most efficient methods, and they all agree that caustic cleaners should never be used. They recommend neutral light bodied soap.[7]

A paste wax[2] or a liquid wax without an oil content[14] is recommended for the periodical maintenance of linoleum floors. They give the surface a fine appearance, and they add to the life of the floor, but they must be applied s-p-a-r-i-n-g-l-y.

When a linoleum floor is waxed s-p-a-r-i-n-g-l-y cleaning becomes only a matter of using a floor brush daily to remove the dust—and the use of a damp (not wet) mop at infrequent intervals.

When linoleum is manufactured, it is impregnated with wax to retard the surface from oxidizing (becoming darker). It can be sealed,[4] provided all the wax is removed by two or three washings with a gasoline or turpentine saturated rag—but this is only recommended for the dark solid color floors. We suggest you apply on small space only, to check if all the wax applied by the manufacturer has been removed—**even though the floor has been down for years.**

CORK SURFACE

Cork tiling is usually baked compressed cork curlings—the baking process causes the gum in the cork to liquefy cementing the whole. Cork carpet is made in strips and it is usually softer and more porous than Cork Tile.

The maintenance of cork floors is similar to linoleum except that it is not practical to apply a sealer to this type of floor on account of its resiliency. Paste wax[2] applied sparingly 3 or 4 times a year is the preferred method.

RUBBER SURFACE

Abrasive cleaners and oil solvent waxes should never be used on rubber floors—a soluble powder cleaner[1] can be used in mopping with safety. Using ¼ to ½ teacup of ammonia to the bucket of mop water cleans and brightens rubber floors. Light bodied soaps[7 and 10] can be used and many prefer this method. A protective sheen may be applied and maintained through the use of a paste wax,[2] or a non-oil solvent liquid wax.[14] A lesser sheen may be applied and maintained through the use of a combined wax and light bodied soap liquid.[7]

HOLCOMB PRODUCTS

1. Puritine
2. Shineze Wax
3. Holcomb Jells
4. Seal Coat
5. Buckskin
6. Puritine No. 4
7. Floor Sheen
8. Tile and Terrazzo Conditioner
9. Holcomb Waxes
10. Veg Oil Soap
11. Multi-Pol
12. Solvit
13. Cement Hardener
14. Hy-Sheen

These items are selected from Holcomb's Catalog No. 67

HILD FLOOR MACHINE COMPANY

108 W. Lake Street, Chicago, Ill.

BRANCH OFFICES IN ALL PRINCIPAL CITIES

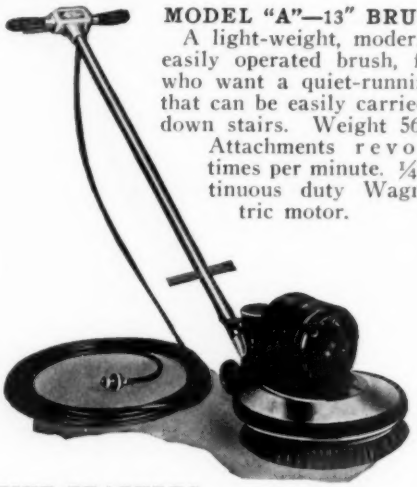
THE HILD FLOOR MACHINE

Several thousand Hild Electrically Operated Floor Machines are in use in schools all over the United States. Treating and polishing with the Hild Floor Machine is the modern, scientific method for maintaining linoleum, cork, tile, composition, wood, rubber and in some cases terrazzo floors. Maintenance costs are cut as much as fifty per cent by eliminating scrubbing.

Hild-treated floors are easy to clean. Dust does not cling to them. Dirt cannot penetrate into the pores. A nightly dry mopping and a weekly polishing with the Hild does the job completely.

Aside from its economy features, treating and polishing with the Hild brings out the beauty in the floor and imparts a beautiful, rich lustre.

And did you know that Hild-treated floors will last about five times as long as untreated floors?



MODEL "A"—13" BRUSH

A light-weight, moderate-price, easily operated brush, for those who want a quiet-running brush that can be easily carried up and down stairs. Weight 56 pounds. Attachments revolve 175 times per minute. ¼-hp. continuous duty Wagner electric motor.

FIVE FEATURES

1. Ease of operation—no strength required
2. Convenience—connect to any lamp socket or baseboard outlet
3. Thorough work. In operation, the entire weight of the machine used rests upon the brush.
4. Simplicity—nothing to get out of order; brushes easily changed
5. Guaranteed for a year against defects

NEW HILD SAFETY SWITCH

Grip Rubber
Lever Operating Hild Safety Switch
Steel Spring to Protect Rubber Cable
This Rubber Bumper Rests on Floor When Handle is Tipped to Remove or Attach Brushes

MODEL "C" 15" BRUSH

Our most popular model. Practically noiseless. Easily operated. Weight, without water tank, 80 pounds. Attachments revolve 175 r.p.m. Master electric motor.

ATTACHMENTS

Scrubbing, Waxing and Polishing Brushes, 20" Polishing Buffer, Steel Wire Brush, Sandpapering Disc, Grinding Disc, and Horizontal and Vertical Water Tanks.

Right: EQUIPPED WITH WATER TANK

MODEL "D"—18" BRUSH

A heavy-duty machine for large floor areas that will insure the work's being done in the shortest possible time. Weight without water tank, 120 pounds. Attachments revolve 175 times per minute. Equipped with ¾-hp. continuous duty G-E motor.

HILD Guaranteed Floor Treatments

Hild "No. 1 Special" Floor Treatment—varnish-wax treatment for wood, linoleum, cork, concrete, tile, shellacked, varnished or stained floors, etc.

Hild "No. 2 Special" Floor Treatment—varnish-wax treatment for rubber, asphalt tile, terrazzo, and marble floors.

Hild "No. 3 Special" Bright-Drying Floor Treatment—a special treatment for all types of floors that requires no buffing or polishing.

Hild Prepared Wax—an extremely durable, high quality paste wax for all floors. Supplied in natural and in colors.

Hild Floor Seal—for sealing porous floors.

Hild "Shine-Brite"—a pure corn and cocoanut-oil base soap for all types of floors.

Hild Crystals—a powerful floor cleaner.

Hild Floor Cleaner and Bleach.

Hild Varnish Remover.

7 SERVICES WITH 1 MACHINE

(All attachments go right up to baseboard)

1. **Bassine scrub brush**—for scrubbing floors spotlessly clean. Will not splash or splatter a drop of water.

2. **Steel wire brush**—for scrubbing cement and concrete floors.

3. **Palmetto waxing brush** (not illustrated).

4. **Felt polishing buffer**—for repolishing treated floors.

5. **Polishing brush**—for polishing wax to a hard, lustrous finish (illustrated below).

6. **Sandpapering disc**—for wood or cork tile (see above).

7. **Grinding disc**—for resurfacing scratched or pitted marble and terrazzo floors (right).

FREE TRIAL OFFER

Where it is impossible to make a personal demonstration, we shall be glad to forward a machine for a five-day trial on conditions to be furnished on written request. But, if possible, **call in the Hild Floor Engineer.** The correct cleaning and maintenance of floors today is a major problem in school building management. The Hild Floor Engineer will be very happy to inspect your floors and advise as to the latest cleaning and maintenance methods best suited to your particular type of floor.

MIDLAND CHEMICAL LABORATORIES

INCORPORATED

Dubuque, Iowa

FLOOR MAINTENANCE MATERIALS

LOOK FOR THE TRADE-MARK

During more than a quarter-century of manufacture, Midland has paid particular attention to floor maintenance. Every step of efficient labor upkeep has been studied and worked with the cleaning and preparation of old floors for new finishes—and the finishing of new floors has been given equally as much research.

LOHSEAL

Is a brilliant, hard, and lasting application which fills pores and cracks and puts floors in perfect condition for all finishes —wax, varnish or stain.

MIDLAND FLOOR MASTER SCRUBBING AND POLISHING MACHINE

The Floor Master Floor-polishing Unit is a handy, practical and efficient machine of just the proper size for all general work. It is reasonable in price, efficient in its performance, and very easy to handle.

LET MIDLAND MAINTENANCE ENGINEERS CONSULT WITH YOU . . . NO OBLIGATION . . . OUR EXPERIENCE IS AT YOUR SERVICE . . . USE IT . . .

GYMLOH

The perfect finish for gym floors. Gymloh not only acts as a seal for your gym floors but also has a maintenance finish and does not need any other application. Gymloh is not slippery but is perfectly safe when basketball or other games are played.

SUN-GLOH

THE WAX THAT DRIES WITH A GLOSS

Is the latest achievement of Midland chemists. This wax is a revelation of ease of application and brilliance of finish without any of the labor and expense of polishing or buffing. Simply apply Sun-Gloh and let it dry.

MID-WAX

Is the finest combination of waxes, combined for their several qualities of durability and brilliance. Mid-Wax requires the usual buffing after application. A permanent wax finish.

LIQUID SOAPS

Midland Liquid Soaps are known wherever this type of soap is in use. Long ago those who had to provide soaps for public or semi-public places learned to depend on Midland. Their quality and economy made them Standard wherever used.

LOHADOR LIQUID SOAP

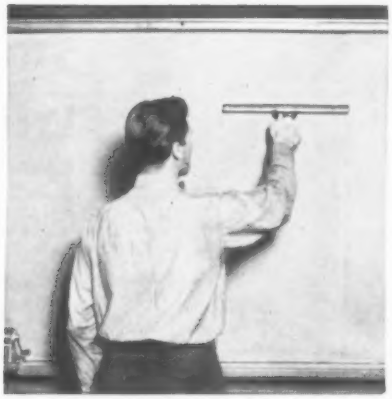
This soap is of outstanding quality and is adaptable for use in schools, hospitals, and many other public places. It has an unusually high true soap content, and due to the high quality of the raw materials used in this soap it is an efficient cleanser of sterling quality which produces an abundance of rich, creamy lather.

EVERY MIDLAND MAINTAINED FLOOR IS A TESTIMONIAL OF WORTH

It thoroughly cleanses the skin and leaves it soft and pliable. All Midland Liquid Soaps are manufactured under very strict chemical control, and are purified and aged to remove any impurities that may be found in the raw materials. These soaps are all aged a sufficient length of time to give them that soft, velvety feeling.

LOOK FOR THE TRADE-MARK

SPECIALIZED SCHOOL PRODUCTS



BLACKBOARD CLEANER

One of the most trying problems of school maintenance is keeping blackboards in such a condition that the writing can be easily seen from any part of the school room without eye strain, and also preventing the building up of a deposit of chalk on the surface of the boards which will result in a gray-colored board.

Blackboards that are scrubbed regularly with Midland Blackboard Cleaner and then carefully rinsed with clear water always have a clean surface upon which writing is easily discernible and which is free from chalk dust.

MIDLAND CORRIDOR MOP

In school buildings there are to be found many large floor spaces which are taken up by corridors. The floors of these corridors present a problem to the custodian in cleaning and sweeping. In order that this work can be efficiently and quickly done with the minimum amount of labor, we have designed our Corridor Special Mop. This mop is intended for dry-mop sweeping, and is a very efficient tool for sweeping large areas of floor space. Once the custodian has become familiar with our Corridor Special Mop, he is sure to be a constant user of it.

SCHOOL HOUSEKEEPING

This exclusive Midland System for the care of modern schools is in use throughout the country. Illustrated lesson books, clear and easy to understand, will be sent to any school executive free upon request. In these booklets are the latest innovations of this important school work, fully explained.

FLUSHOLEUM

A product for the removal of discolorations, stains and deposits of scale from toilet bowls and traps. Flusholeum will keep your traps free from chemical deposits which sometimes cause a great deal of inconvenience by clogging the traps.

SHILOH PORCELAIN CLEANER

This product can be used with safety for cleaning porcelain and vitreous enamel ware, such as sinks, lavoratories, bath tubs, enamel kitchen ware, stoves, refrigerators, etc., without the slightest danger of scratching or injuring the vitreous enamel finish.

PIPEOLEUM

For use in cleaning out clogged up traps and drain pipes in sinks, lavoratories and toilets. Pipeoleum will dissolve hair, grease, small pieces of wood, cloth and many other things with which pipes may become clogged. Pipeoleum may also be used for thawing frozen pipes.

BONLOH

A metal polish par excellence for brass, copper, silver or any stained or tarnished metal surface. An efficient metal cleaner and polish.

ALLAN J. COLEMAN

Manufacturers of Sewer, Pipe, Closet and Drain Cleaning Tools

208 North Wabash Ave., Chicago, Ill.

FLEXIBLE CLOSET CLEANERS

COIL WIRE CLOSET CLEANER

Instantly removes obstructions from water closets, drain pipes, etc.

Grade A

C-510-515. Flexible Coil made of a special prepared non-corrosive **Swedish Spring Steel Music Wire**, No. 12 gauge, ½" size, with removable corkscrew and cone wire.

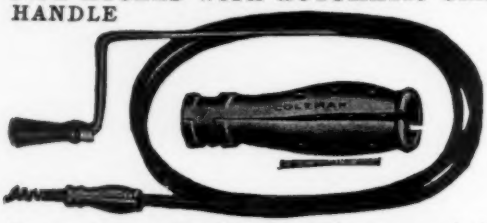
C-510 — 3-ft. Music Steel Wire Spring.. $5.50
C 515 — 6-ft. Music Steel Wire Spring.. 6.50

Grade B

Made of good oil-tempered steel, 12-gauge wire ½-in. size.

C-516—3-ft. coil, black enameled $4.00
C-517—6-ft. coil, black enameled 5.00

FLEXIBLE COIL WIRE SEWER AND PIPE AUGERS WITH AUTOMATIC GRIP HANDLE



For use in removing obstructions in vacuum, drain pipes or sewers. Made of the best oil-tempered spring steel, and are flexible, enabling them to turn bends and go through traps. Made with cork-screw and handle complete, also furnished with automatic grip handle.

Style No.	Size, In.	Lgth., 6′	Lgth., 9′	Lgth., 15′	Lgth., 25′	Lgth., 50′	Lgth., 100′
C-520a ...	3/16	....	$1.50	....	$2.50	$4.50	$8.00
C-520b ...	¼	....	1.75	....	3.00	5.00	9.00
C-520	⅜	$2.25	3.00	$5.00	7.50	12.00	20.00
C-525	½	2.50	3.25	5.50	8.00	15.00	25.00
C-528	⅝	....	....	6.50	9.00	16.00	30.00
C-530	¾	10-ft. sec., hdl. and corkscrew. $5.50					
		Extra 10-foot section 5.00					
C-535	1	10-ft. sec., hdl. and corkscrew. 6.50					
		Extra 10-foot section 6.00					

For cleaning out straight sewers or drains. Made of a special oil-tempered, flat spring, steel wire. Equipped with spear point, roller ball and grip handles, which increases efficiency. Use either end.

Style No.	Width and Thick.	Length, 25 Feet, Price	Length, 50 Feet, Price	Length, 75 Feet, Price	Length, 100 Feet, Price
C-536...	¼ x 1/16	$1.85	$3.50	$5.00	$7.00
C-537...	½ x 1/16	2.40	4.50	6.00	8.00
C-538...	¾ x 1/16	4.00	6.00	8.00	10.00
C-539...	¾ x ⅛	5.00	7.00	10.00	14.00
C-539A .	1 x ⅛	6.00	8.00	11.50	15.75
C-540...	1 ¼ x ⅛	6.00	9.00	12.00	16.00
C-542...	1 ½ x ⅛	7.00	10.00	15.00	20.00

Most perefctly equipped rods made.

FLEXIBLE MUSIC SPRING WIRE SEWER AND PIPE AUGERS

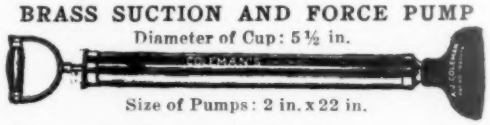
THE STRONGEST, MOST PERFECT AND COMPLETELY EQUIPPED FLEXIBLE PIPE AND SEWER AUGERS ON THE MARKET

Style No.	Size, In.	Size Wire	Lgth., 25′	Lgth., 50′	Lgth., 75′	Lgth., 100′
C-450 ..	¼	No. 14 gauge	$5.00	$9.00	$14.00	$18.00
C-460 ..	½	No. 11 gauge	12.00	22.00	30.00	38.00
C-470 ..	11/16	No. 10 gauge	20.00	30.00	40.00	50.00

Above prices include frame, handle and points.

BRASS SUCTION AND FORCE PUMP

Diameter of Cup: 5½ in.



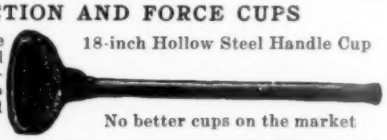
Size of Pumps: 2 in. x 22 in.

Large reversible Rubber Cup. Fits any opening up to 5 inches. Wonderful article for opening sinks and drains.

C-500—Pump with Cup. Weight, 6 lbs...Each $12.00
C-505—Cup only. Weight, 1 lb.....Each 1.50
C-508—Graphite packing rings.....Per set 1.50

SUCTION AND FORCE CUPS

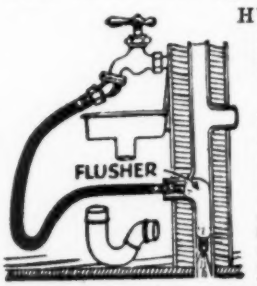
High grade rubber. All handles secured to Cup by threads and sockets.



18-inch Hollow Steel Handle Cup

No better cups on the market

Style No.	Size, In.	Color	Wood Handles, In.	Price Per Doz.
C-545	5½	Red	Steel 18	$24.00
C-550	5½	Red	Cup Only	18.00
C-555	5½	Red	Wood 30	15.00
C-560	5½	Black	Wood 30	12.00
C-565	4½	Red	Wood 30	9.00
C-570	4½	Black	Wood 30	7.80



HYDRAULIC FLUSHER

House Faucet Connection. Standard Size of Flusher for House Plumbing That Gives Results

This Sewer Flusher is made of several plies of water-tight heavy rubberized fabric which makes it Strong, Durable and Flexible, easy to insert into traps, vents, curved sewer drains or pipes. A very efficient article when it is necessary to wash out pipes or sewers. When connected with strong water pressure, flusher is expanded to size of drain, thereby giving a direct water pressure close to stoppage. Sizes to fit all pips.

Size of Pipe Sewer and Flusher	Standard Coupling	Price
No. 1—1½" Sink Flusher	¾"	$3.00
No. 2—Sink, 2" Catch Basin..	¾"	3.25
No. 3—3" Pipe Flusher	¾"	3.50
No. 4—Pipe, 4" or Toilet	¾"	4.75
No. 5—Heavy, 4" Sewer	¾"	5.25
No. 6—Pipe, 6"	¾"	7.50
No. 7—Sewer, 6" Extra Heavy Flusher	¾"	8.00

LARGE HEAVY FLUSHERS FOR CITY WATER PRESSURE

Catalogues Sent on Request

THE KENT COMPANY, INC.

Manufacturers of

KENT

ELECTRIC FLOOR MACHINES

and

COMMERCIAL VACUUM CLEANERS

Main Office and Factory: 110 Canal St., Rome, N. Y.

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NEW YORK, BOSTON, CLEVELAND, PHILADELPHIA, WASHINGTON, D. C.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

KENT Electric Floor Machines have been serving hundreds of schools and colleges thruout the country for the past twenty years, doing the daily scrubbing, waxing, polishing, floor refinishing and cleaning — lowering costs — saving time, making floor care EASY and PLEASANT —doing the work SPEEDILY and with ABSOLUTE THOROUGHNESS, at but a fraction of the expense entailed by manual methods.

You simply guide the machine—the motor-driven revolving brush, pad or disc does the work. Connect the machine to any electric light or power socket. Scrubs SPOTLESSLY clean, waxes THOROUGHLY and polishes to a MIRROR-LIKE finish, or equipped with a steel wire brush and sandpaper disc, it removes old paint and varnish and RENEWS old floors.

Made in various sizes to suit all requirements.

A trial will convince you.

Model "A" for use on small floor areas,—brushes 11-inch diameter, weight of machine on brush 35 lbs. Model "B" for use on medium floor areas,—brushes 11-inch diameter, weight of machine on brush 65 lbs. Model "C," a heavier machine, especially adapted for large floor areas,—brushes 13- or 15-inch diameter, weight of machine on brush 85 lbs.

A FEW OF THE HUNDREDS OF SCHOOLS AND COLLEGES NOW USING THE KENT METHOD OF FLOOR MAINTENANCE

University of Florida, Gainesville, Fla.
Ohio University, Athens, Ohio
Academy Sacred Heart, San Juan, Porto Rico
University of Pennsylvania, Philadelphia, Pa.
Baylor University, Dallas, Tex.
Notre Dame Academy, Chicago, Ill.
Sacred Heart School, Springfield, Mass.
Central College, Pella, Iowa
Castle Heights College, Lebanon, Tenn.
Okmulgee High School, Okmulgee, Okla.
Independent School Dist., Watertown, S. D.
State College of Washington, Pullman, Wash.
Janesville Vocational School, Janesville, Wis.
Beloit College, Beloit, Wis.
St. Mary's College, Brockville, Que., Canada
Board of Education, Clarksdale, Ariz.
Eureka High School, Eureka, Calif.
Loyola College, Montreal, Que., Canada
Michigan State College, E. Lansing, Mich.
Cornell University Medical College, New York, N. Y.
Board of Education, Aurora, Ill.
Board of Education, Pella, Iowa
Lawrence College, Appleton, Wis.
Iowa School for the Deaf, Council Bluffs, Iowa
Associated Students University of Calif., Berkeley, Calif.
Indiana University, Bloomington, Ind.
Board of Education, Shelby, N. C.
Chilocco Indian School, Chilocco, Okla.
Johns Hopkins University, Baltimore, Md.
Harvard University, Cambridge, Mass.
Washington State Normal School, Ellensburg, Wash.
University of Montana, Bozeman, Montana
State University, Norman, Okla.
Lehigh University, Bethlehem, Pa.
University of Washington, Seattle, Wash.

Further details may be obtained by writing for our illustrated folder.

THE TROPICAL PAINT & OIL COMPANY

General Offices and Factories

1208-1250 West 70th St., Cleveland, Ohio

TROPICAL

Special Paints for Schools

For years we have specialized in the manufacture of Paints, Enamels, Varnishes and Roof Coatings for the protection of large buildings. During this time we have developed many coatings for educational institutions.

Our whole energy is bent toward the improvement and development of our maintenance products. It pays to buy from specialists like ourselves, because you are sure of getting the most suitable coating for every surface and one which will give long wear and satisfaction.

The Tropical Surface Saver

From an advertisement in *The Saturday Evening Post.*

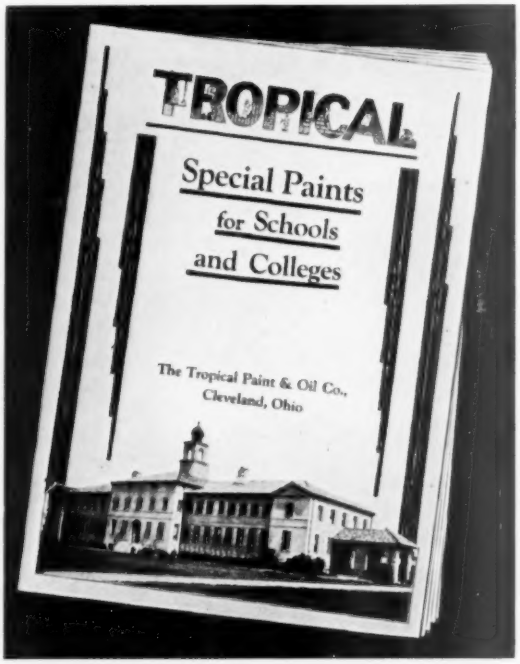
We maintain a staff of men covering the whole country, who are known as "Tropical Surface Savers." They have been trained in paints and painting problems and know how to analyze painting conditions.

The "Tropical Surface Saver" in your locality will be glad to apply his knowledge to your problems. This is a service of which you can avail yourself free of charge.

Book Sent Free to School Officials

The book pictured here is given free to school officials. It was designed especially to help those who are responsible for the maintenance and upkeep of school buildings.

In its pages you will find information about protecting and decorating difficult surfaces like swimming pools, shower rooms, laboratories and toilet rooms. It also contains pictures of many educational institutions where Tropical Protective Coatings are now in use, and descriptions of those products, which are designed for school buildings.



Another useful feature of this book is an alphabetical index of all surfaces that need protection around educational institutions, and opposite each is the name of the Tropical Product that is designed to decorate and protect that particular surface.

This book will make a valuable addition to your information file. A copy will be sent free on request.

PONSELL FLOOR MACHINE COMPANY

Main Office
228 West 19th Street, New York City

SALES OFFICES IN PRINCIPAL CITIES

Ponsell
FLOOR MACHINES

PONSELL floor machines have been manufactured by us uninterruptedly since the year 1911—21 years ago. When you buy a PONSELL, you buy a machine which has stood the test of 21 years and is today in use in thousands upon thousands of buildings and schools. This record we point to with pride, and it is the safeguard of prospective purchasers—your investment in a PONSELL is safe—it is a time-seasoned product manufactured by a time-seasoned firm.

Models E and G embody **8 new features** which are of decided importance from the practical standpoint of operation in school buildings:

1. **PERFECT BALANCE**—Center of gravity of machine directly over center of brush, eliminating all strain on arms of operator.
2. **UNIT TRANSMISSION**—Complete transmission contained in a unit rigidly bolted to the motor itself. Perfect meshing of gears insures absolutely quiet operation.
3. **BUILT IN MOTOR CONNECTIONS**—No exposed wiring between motor and handle—All connections built right into frame of machine. Eliminates any possibility of damage to wiring.
4. **SELECTIVE SWITCH**—Can be set at will so that it shuts itself off the moment operator releases the handle bar trigger, or set so that current remains on until switch is turned off by operator.
5. **SAFETY HANDLE**—All portions of handle with which hands of operator come in contact made of insulating materials. Does away with any possible danger of electric shock.
6. **GREASE-TIGHT DESIGN** — Absolutely eliminates any possibility of leakage of grease from transmission. No danger of grease spots on floors. No danger of transmission's running dry. Machine operates 1000 hours on one lubrication.
7. **INDESTRUCTIBLE BUMPER**—Made of solid white molded rubber, covering entire face of brush apron and keyed to the apron—absolutely indestructible. Positive protection of baseboard and furniture.
8. **NON-WARP BRUSH BACKS** — Made of a composition not affected by water or humidity. Will not warp. Far superior to ply-wood. Periphery of brush in line with outside of bumper, permitting treating floors right up to the baseboard.

The New models described on this page, introduced in the latter part of 1931, are the culmination of 21 years of experience coupled with the ingenuity of our engineers always striving to produce the very best in high quality floor machines.

3 SIZES

G-18 (new model)
¾-hp. motor, 18-inch diameter brushes.
Weight—125 lbs.

E-15 (new model)
½-hp. motor, 15-inch diameter brushes.
Weight—105 lbs.

B-11—¼-hp.
11-inch diameter brushes.
Weight — 45 lbs.

You can see the PONSELL at work on your own floors before you buy it—Write for full information and prices

SCRUBBING—WAXING—POLISHING—SANDPAPERING—REFINISHING

THE AMERICAN SCHOOL AND UNIVERSITY

SCOTT PAPER COMPANY

Manufacturers of

TISSUE TOWELS AND TOILET TISSUES

Chester, Pennsylvania

DISTRIBUTORS IN ALL LARGE CITIES

Thirsty Fibre Towels packed 150 to the carton, 25 cartons to the case

Attractive towel cabinet at left—white or olive green — holds 250 towels

Thirsty Fibre Towels

Scott Thirsty Fibre Towel service provides you a constant supply of fresh, clean, individual towels.

It saves you money, too. Waldorf Towels cost only $1.75 per person per year. ScotTissue Towels cost very little more.

Either is more economical than adequate cloth towel service.

More economical than ordinary paper towels, too. They're actually 10 times more absorbent—because of the "thirsty fibres" and the special double fold. They're softer, too, and strong even when wet. Send for a free sample carton of ScotTissue or Waldorf Towels. No obligation.

ScotTissue Service Roll

Specially packed for large consumers, ScotTissue actually costs less than so-called "cheap" toilet tissues.

It's scientifically processed to satisfy strictest medical requirements.

Many institutions in all parts of the United States are installing it because they find it both safer and more economical than coarse, inferior tissues.

Each roll of ScotTissue contains 1000 sheets with clean-cut perforations which tear easily and evenly. One hundred rolls are packed per case

L. SONNEBORN SONS, INC.

88 Lexington Avenue, New York, N. Y.

LAPIDOLITH

Chemical Concrete Floor Hardener

This is a liquid material which acts chemically on the concrete and produces a flint-like surface. Lapidolith has been used for over 20 years in thousands of schools as the most economical and permanent protection against the breaking up of concrete floors and the consequent annoying dusting problem. Lapidolith is flushed on like water; the cost is negligible; it is equally efficient for new and old floors.

COVERING CAPACITY: For the treatment of every 100 sq. ft. of concrete floor space, from 1¼ gallons to 1½ gallons of Lapidolith will be required for the three coat application recommended.

LIGNOPHOL

Wood Floor Finish and Preservative

A preservative for prevention of warping, rotting and dusting of wood floors.

A penetrating preservative of specially treated oils and gums which penetrate the wood and increase the tensile and resisting strength of floors. A protective coating against deterioration from dry rot or moisture. Suitable for new and old floors. Made in penetrating or wax finishes, and in four colors harmonizing with the popular types of wood used for floors. Easy to apply; permanent in protective and finishing results.

COVERING CAPACITY: Hard wood, 1 gallon covers about 400-500 sq. ft. one coat; Soft wood, 1 gallon cover about 350-400 sq. ft. one coat. Spreading capacity will vary with the wood and the surface porosity.

HYDROCIDE EXTERIOR COLORLESS WATERPROOFING

If you are confronted with dampness in your building, the use of Hydrocide Colorless, according to directions, is the most economical form of a remedial measure. It penetrates the surface, producing exterior walls which are water-repellent. It is not of a paraffin or oil base and, consequently, can be safely used without the risk of discoloring or marring the beauty of the stone. It can be applied by brush or spray. Special directions will be furnished to meet your own problem.

COVERING CAPACITY: First coat will cover about 100-125 sq. ft. Second coat will cover about 125-150 sq. ft. per gallon, one coat.

SONNEBORN'S CEMENT FILLER and DUSTPROOFER

Ordinary floor paints will not do for school floors where traffic is constantly severe. This product has been in wide use in schools throughout the country and has proved durable under the most extremely severe conditions. Any decorative color scheme can be followed out as there are a variety of colors to choose from, or it can be had in a transparent color.

COVERING CAPACITY: Approximately 200 sq. ft. a gallon, two coats; 350 sq. ft. per gallon, one coat.

Other Sonneborn Special School Products:

RUB-LESS WAX

A guaranteed quality wax product which requires no polishing.

CEMCOAT ENAMEL PAINT

A specially formulated enamel of the highest quality, of a pure linseed oil, lithopone and zinc base, in a variety of colors. Cemcoat is unusually light reflecting. It can be washed time and again without losing its gloss or affecting the durability of the film. Special directions for application will be furnished to suit your own requirements.

There is no gamble when you use Sonneborn Guaranteed School Maintenance Products

Thousands of schools throughout the country, many in your own community, will testify to the practical value of the advice our school division has given in solving perplexing problems with an economy of time and money; thousands of schools have been using Sonneborn products for years. The best guarantee is the service secured from the use of these products right in your own community.

Write Us for Information and Prices

AMALIE PASTE or LIQUID WAX

For economy and real service, these products meet a definite school need.

MAG-I-SAN

A cleaning powder for general use on floors, walls, utensils, etc. Has unusual cleaning properties; perfectly harmless; unusually economical.

THE SPENCER TURBINE CO.

Hartford, Connecticut

THE SPENCER SYSTEM OF VACUUM CLEANING

The Spencer Multistage Turbine System of Vacuum Cleaning has met with the approval of architects and engineers everywhere, and has been installed in more than 10,000 buildings, including more than 1500 school buildings.

Cleaner Schools—For school buildings, the Spencer System has introduced a new standard of cleanliness. Numerous tests have demonstrated that the Spencer System removes 25 to 50 per cent more dirt in pounds under similar conditions than other methods.

No Dust—The Spencer System removes dangerous dust. Even the finest dust is drawn in by large volumes of air under heavy vacuum and goes down to a container in the basement.

Speed—The Spencer System saves time. The Spencer System usually shows a saving of 20 to 30 per cent of the operator's time on bare floors. In cleaning other parts of the school building, however, such as rugs, walls, chalk trays, etc., there can be no comparison. If the janitor were to attempt to clean these parts as well as the Spencer System does, it would require two to ten times as much work!

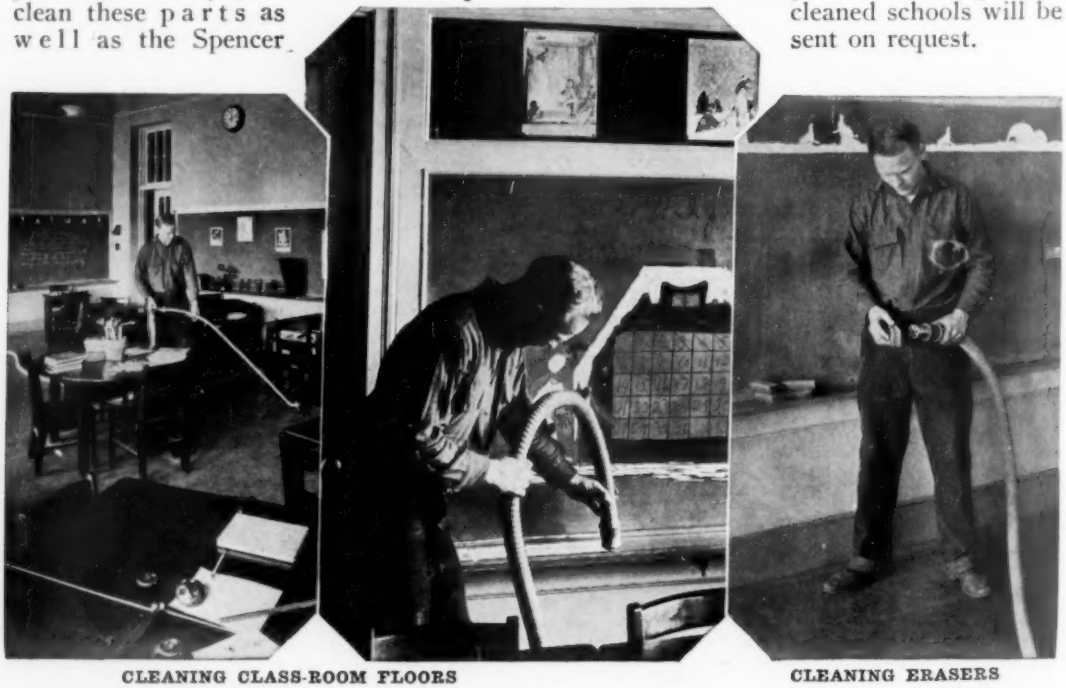
For Cleaning Erasers and Chalk Trays—The Spencer System, instead of scattering the great bulk of the chalk dust on the floor, provides a method of cleaning erasers and chalk trays that is rapid, sanitary, easy and thorough. The janitor has only to attach a special tool and move it across the surface of the eraser or the chalk tray.

Cleans the Boiler Room—This system cleans boiler room floors—removes dust and soot from pipes and draws soot out of the boiler tubes, often saving the whole cost of operation in this one item alone.

Swimming Pool Cleaning Equipment—By means of special cleaning tools usually employed in connection with the pump on the filtering system it is possible to remove accumulated sediment from swimming pools without the waste of water involved in draining the pool. Bulletin on request.

BOOKLET

A number of Spencer-cleaned schools are illustrated in our booklet. A copy of the booklet and a complete list of Spencer-cleaned schools will be sent on request.



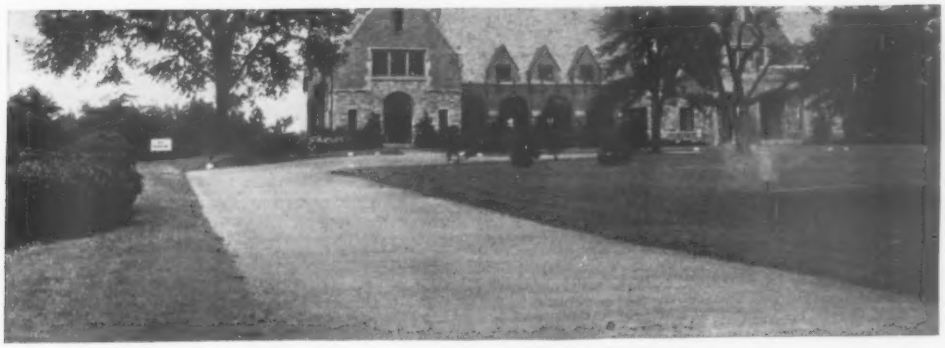
CLEANING CLASS-ROOM FLOORS

CLEANING ERASERS

5835

STANDARD OIL COMPANY OF NEW YORK, INC.

26 Broadway, New York, N. Y.



ROAD CONSTRUCTION WITH SOCONY ASPHALT PRODUCTS

Socony Asphalt Binders "B" and "C"

Socony Cold Patch Asphalt

STANDARD

ASPHALTS (Socony Brand)

Socony Liquid Asphalt

Socony Asphalt Joint Fillers

Asphalt Macadam Roads

Asphalt Macadam Roads built by the Penetration Method are recognized by leading engineers as one of the most durable types of construction, being economical in cost and maintenance. This type presents a non-skid, all-weather surface, ideal for school and university grounds.

Socony Asphalt Binders "B" and "C" are widely used for such construction, in amounts varying from 2 to 3 gallons per square yard, being applied at temperatures ranging from 275 degrees to 350 degrees.

For Surface Treating of Gravel Roads and Paths

For economical treatment of dirt and gravel roads and paths, where it is desired to lay the dust and protect the surface with an Asphaltic mat, Socony Liquid Asphalts are produced in different grades to meet particular requirements. Socony Liquid Asphalts are usually applied in amounts varying from ¼ to ½-gallon per square yard and require a cover of sharp sand or clean gravel.

For Repairing Road and Path Surfaces

Socony Cold Patch Asphalt is an ideal patching material for repairing holes, ruts and depressions in all types of bituminous road surfaces. It is equally effective for restoring worn, uneven surfaces of brick and wood block pavements.

For each cubic yard of ½-inch to ¾-inch dry stone, we recommend the use of about 16 gallons of Socony Cold Patch Asphalt. Socony Cold Patch Asphalt is used without heating and is workable the year round.

For Filling Joints of Brick and Concrete Pavements

Socony Asphalt Joint Fillers for filling the joints of brick and concrete pavements are specially refined Asphalts of high melting point. They are either poured or squeegeed into the joints, and produce a rigid, noiseless and easily repaired pavement.

Two Contrasting Types of Landscape Treatment

Bremer W. Pond, Landscape Architect

THE MEN'S DORMITORY GROUP, UNIVERSITY OF NEW HAMPSHIRE, DURHAM, N. H.

Hare & Hare, Landscape Architects

A PORTION OF THE CAMPUS, UNIVERSITY OF KANSAS, LAWRENCE, KANS.

Section IV

THE PLANNING AND LANDSCAPING OF SCHOOL GROUNDS

Combining School Grounds, Playgrounds and Neighborhood Parks in Palos Verdes Estates, California

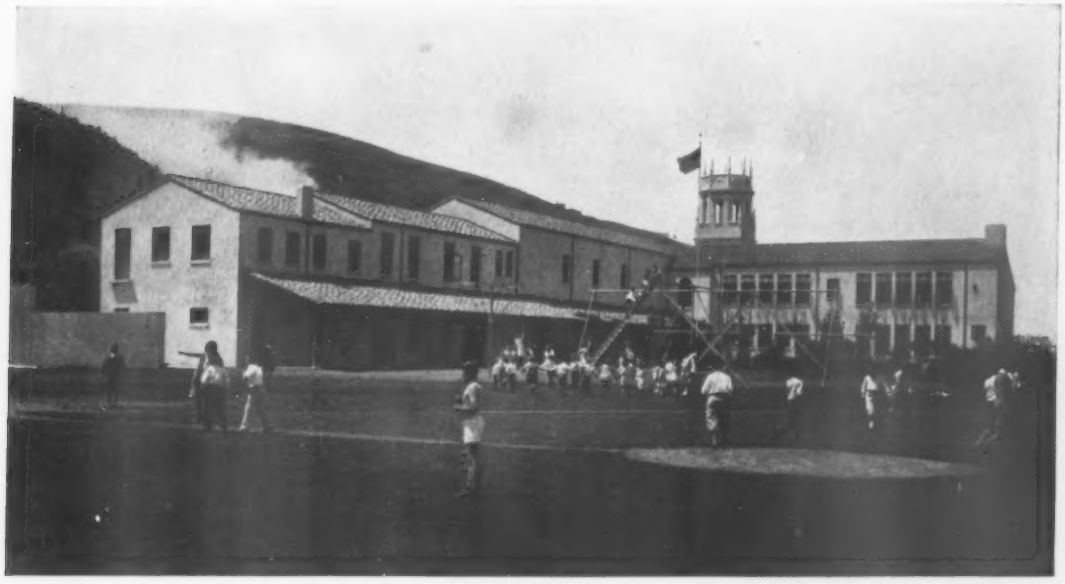
By CHARLES H. CHENEY
City and Regional Planner

PALOS VERDES ESTATES, Calif., is fortunate in being a suburb that has 4,000 miles of blue Pacific Ocean at its door, and all the parks, trees, playgrounds and planting that one could ask for. In fact, one-quarter of the entire district is park land owned in common. Yet this area is only 20 miles from the center of a metropolitan city of two-and-a-half million people. Because it has been planned in accordance with the principles of modern city and regional planning, which recognize that adequate recreational and open spaces are essential in a residential community, the writer has been asked to tell something of how school grounds and playgrounds are combined with neighborhood parks in Palos Verdes.

Palos Verdes lies at the southwest corner of the Los Angeles metropolitan area, at the point of Santa Monica Bay. It covers the range of hills and seacoast from Redondo to the city's great harbor at San Pedro. The Palos Verdes Ranch consisted of some 25 square miles when, in 1921-23, it was developed as a residential suburb. Five square miles have been improved and partially built upon, all according to a comprehensive master plan prepared by Olmsted Brothers, landscape architects, and the writer.

The 10-25-40 Standard

The question of how much land should be devoted to open spaces, playgrounds, parks and recreational uses, was one of the most carefully studied and, in the case of the playgrounds, one of the most difficult to solve, because there were so few flat areas on these rolling seacoast hills.



PART OF THE PLAYGROUND AT THE MALAGA COVE SCHOOL, PALOS VERDES ESTATES, CALIF.

The 10-25-40 standard of combined school site, public playground and neighborhood park was finally adopted after careful study of the needs both of children of school age and of adults, based on the experience of many older cities of the country. The standards, briefly, call for 10 acres for an elementary school site, combined with a children's playground and a neighborhood park, to be spaced approximately a mile apart throughout the district; 25 acres for a junior high school site and juvenile playfields, to be about two miles apart; and 40 acres for a senior high school site and playfields for both students and adults, combined with a neighborhood park, about three miles apart.

The 10-acre elementary site includes roughly 2 acres for buildings, 6 for playgrounds, and 2 for neighborhood park and the dense border plantations necessary to make the school and playground a good neighbor to adjoining residential property. The larger junior and senior high school sites were figured to be divided in similar proportion, each with its strong border plantation 30 or 40 feet deep to screen off activities and give a parklike character to enhance rather than to depreciate neighboring property.

SOME OF THE YOUNGEST CHILDREN ON THE SCHOOL LAWN

Additional Park Areas

Other kinds of recreational areas and planting strips were also found advisable in Palos Verdes. Thus there is a large 220-acre park, more than half of which is used for a fine golf course; a shore park four miles long, comprising all the shore from the top of the bluff to high tide line; planting-screen strips, from 30 to 60 feet in width, all around the business zones; islands at street intersections; a border plantation marking the outside boundary of the whole district and divid-

THE SCHOOL GARDEN AT THE MALAGA COVE SCHOOL

ing it from other properties not properly restricted; bridle trails and planted walks, from 25 to 50 feet in width; and numerous steep planted slopes.

Careful economic studies and the long experience which Olmsted Brothers had had with some of the foremost residential suburbs of the country—such as the Roland Park-Homeland-Guilford section of Baltimore; Forest Hills, L. I.; and St. Francis Wood in San Francisco—led to the conclusion that it is cheaper in many districts to leave beautiful stretches of hillside as park, thereby enhancing the value of the whole community, than to build expensive roads to those districts. The community thus gains a number of very valuable areas.

In the end it was found that in Palos Verdes Estates the best use of the district would be served by devoting practically 25 per cent of the entire area to parks and playgrounds. Another 25 per cent went into the roads, business plazas and connecting parkways. Thus there was left a net salable area of a little less than 50 per cent of the property.

Providing for Maintenance

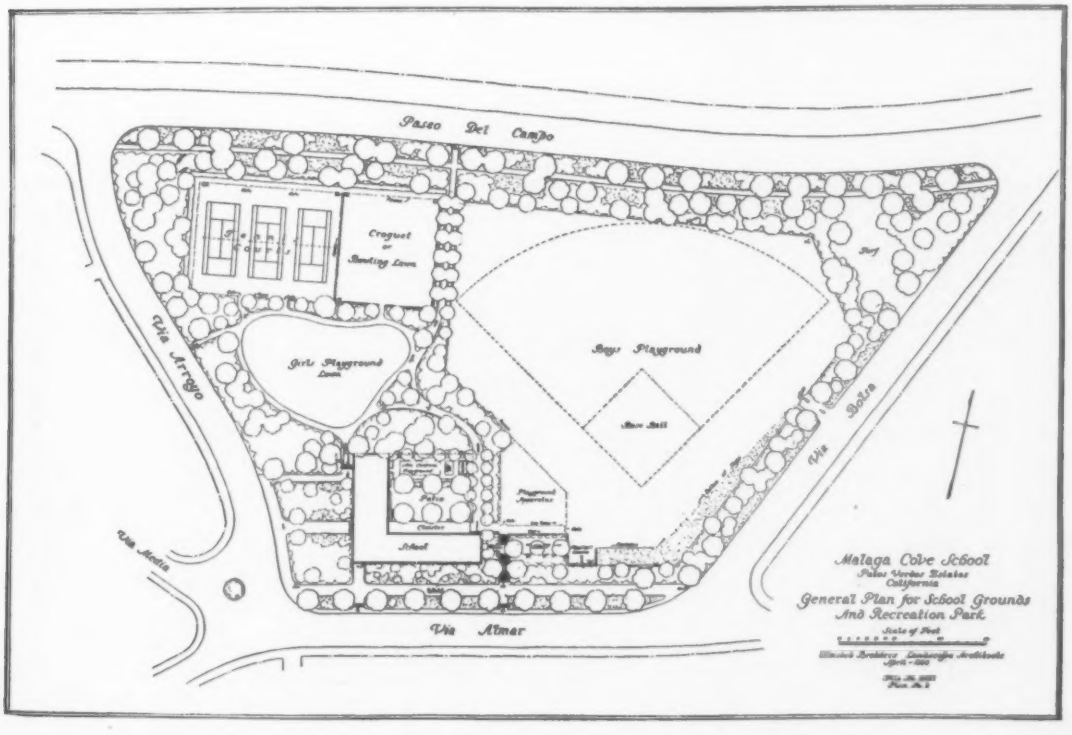
Obviously, so much park area would become a liability unless kept up. Accordingly, a community maintenance association was established, by means of protective restrictions running with the land. The association imposes an annual tax of about 1½ per cent on the assessed value of the land. The restrictions provide that not less than 25 per cent of the tax shall be spent annually on the maintenance of parks, playgrounds and community lands. The association was then deeded 750 acres of recreational areas, which includes seven 10-acre elementary school and playground units, one junior high school, and one senior high school unit; other school sites are planned for the adjoining property when annexed.

These lands include today a finished golf course and golf club, a bathhouse and a swimming pool on the edge of the ocean, and two playgrounds around completed school buildings. The lands so held in common by the association (in which every lot owner has a vote) could not be purchased today for less than $2,000,000.

The Malaga Cove School

The design of the first combined school, park and playground at Malaga Cove School is here reproduced. Actually the block contains only 7 acres, because across Paseo del Campo to the north is a magnificent ocean bluff park extending from the sea eastward until it connects with the 220-acre golf club park. Practically all the other elementary units exceed 10 acres.

At the Malaga Cove site, two acres were deeded by the association to the school board for a building site, with the understanding that the $10,000 received for it would be used for improvement of the playground. The remaining 5 acres remains in the hands of the association, which keeps up all the planting out of its annual maintenance fund.



The beautiful sidewalk trees, shrubs and flowers which now line the principal streets of the Malaga Cove district, and which are expected eventually to be duplicated on all the streets of Palos Verdes, make it a rarely beautiful home neighborhood. Combined with the requirement that every building be approved as to design and color by the Palos Verdes Art Jury, the environmental effect is unusually lovely and satisfying.

Most of the fine qualities developed in Palos Verdes can be attained by other communities of the country. They are but the result of successful experiments elsewhere, largely made by public bodies, school boards, playground commissions, park boards, etc. It is obvious that if equal opportunity for recreation is to be given to all, the city must plan to distribute the necessary kinds of playgrounds and parks over its whole area. It then becomes the duty of the various administrative officers to see that a balanced program of development is followed so that no part of the present population will be treated unfairly and that the needs of the future population will be properly looked out for.

Landscaping the Rye Neck School Grounds

By EDGAR L. HOWE

Clerk, Union Free School District No. 1, Rye, N. Y.

WHEN the School Board of District No. 1, Rye, N. Y., commonly called Rye Neck, decided to build an elementary school a little different from the usual stereotype, it also agreed to set aside sufficient funds to landscape the grounds in harmony with the architecture of the building. A landscape architect was engaged.

The Rye Neck School is set well back from the highway, which has been lined with shade trees. Walks of colored flagstone lead from the highway sidewalk to the doors of the school, and a long expanse of lawn carries the eye to the planting around the building. The Board felt that good lawns are important from an esthetic point of view and also because they contribute to the development on the part of the children of a feeling of pride in the school.

The problem of providing lawns was twofold, involving, first, actual construction, which was comparatively simple, and, second, adequate and economical maintenance. Having assured the proper construction of permanent lawns, the Board felt that the additional expenditure of an underground irrigation system would be amply justified by its immediate as well as its permanent effects. Accordingly, the system was installed and the front lawns were seeded about September 15. In spite of a discouraging drought, the grass had grown enough in a few weeks to require mowing.

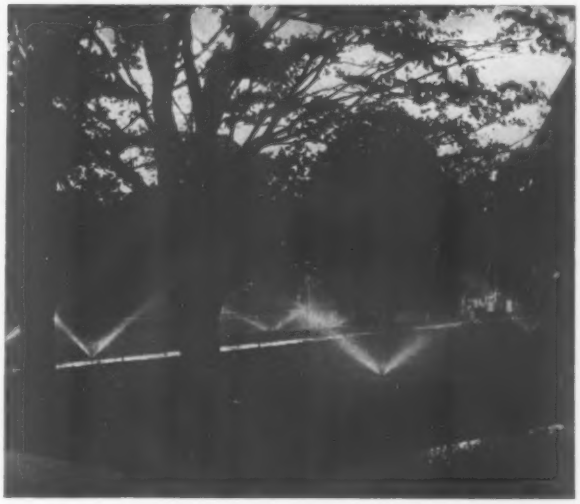
It would have been impractical to attempt to water these lawns by hand, and undoubtedly without artificial rain the entire area would have had to be reseeded. This would have meant additional expense and considerable waiting for lawn effects. As a matter of fact, the temporary lawn areas at the rear of the school, in which no irrigation system was installed, were seeded at about the same time. Not only have these lawns not been mowed but they will require more time and the expenditure of a substantial sum before

H. J. Marquardt, Landscape Architect *Conrad C. Henne, Architect*

THE RYE NECK SCHOOL, RYE, N. Y.

they can equal the condition of the front lawns.

Another important asset to school grounds is a good practical playground. Formerly the Board constructed recess play areas with gravel, cinders or bluestone screenings, using clay as a binder. These areas can be used most of the year, but they are extremely muddy during the late fall and early spring, and result in wet feet, possible sickness and a muddy building to clean up. It was felt that the playgrounds for the new school should be so constructed that they can be used for play in all seasons. At Rye Neck, therefore, we used a plastic black-top over a Telford base, into which was rolled powdered green slate. This not only enhances the appearance of the actual play areas but also harmonizes with the lawns and shrubbery adjoining it. The initial cost of this type of construction was about 35 per cent higher than the cost of the usual type, but the Board believes that the omission of yearly maintenance items, the reduction of building wear and tear, and the increased playtime made available, will more than justify the additional expense.



SPRINKLING THE LAWN OF THE RYE NECK SCHOOL

A third matter affecting the grounds which required attention was the question of parking facilities. In view of the fact that it was necessary to construct a service road to the building, it was deemed advisable to construct a parking area large enough to accommodate fifty cars. The school is located on a busy, rather narrow thoroughfare, and the parking area not only relieves traffic congestion at this point but also makes for greater safety and protection for the children and passersby.

What Difference Does a Lawn Make?

Francis Hastings Gott, Landscape Architect *Leon Stern, Architect*

TWO VIEWS OF THE ALLEN'S CREEK SCHOOL, DISTRICT NO. 6, BRIGHTON, N. Y.

Three Examples of What Landscaping Will Do

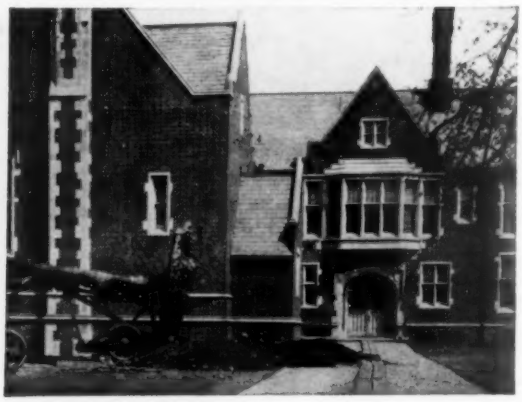
BEFORE

AFTER

Marjorie Sewell Cautley, Landscape Architect

The Tenafly, N. J., Outdoor Theater

BEFORE



AFTER

A. F. Brinkerhoff, Landscape Architect
Harry Leslie Walker, Architect

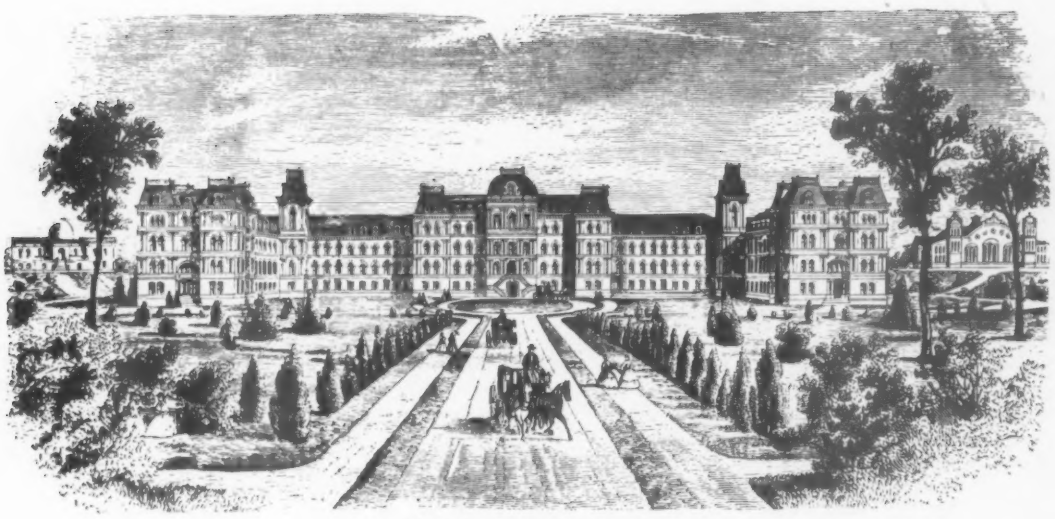
The Bronxville School, Bronxville, N. Y.

BEFORE AND AFTER.

S. R. DeBoer, Landscape Architect

W. N. Bowman, Architect

The Byers Junior High School, Denver, Colo.



VASSAR COLLEGE IN 1865

The Evolution of a College Campus

BY HENRY E. DOWNER

SUPERINTENDENT OF GROUNDS, VASSAR COLLEGE, POUGHKEEPSIE, N. Y.

WHEN Matthew Vassar set about to realize his dream of establishing "Vassar Female College," he wisely chose a spacious country site outside the city of Poughkeepsie, N. Y., rather than a more restricted area near the Hudson River which at first attracted his attention.

The place selected was the Mill Cove Estate, about three miles from the river. The boundary lines of this area of 198 acres were very irregular, but it was attractive, presenting "at many points beautiful landscape effects near and remote." The site chosen for the College building was on a sandy plain, once the Dutchess County Race Course. Here, on June 4, 1861, Matthew Vassar broke ground for the erection of the large building now known as Main, at that time said to be the "largest under a single roof in the entire land." Its doors were opened to the entering class in September, 1865, and beneath its roof the President and members of the Faculty also had their living quarters for several years. Two other buildings made up the original group: the Observatory, to the northeast of Main; and to the southeast the large building known to most Vassar women as Assembly Hall, which was used for the first years as a riding school and gymnasium.

Some 70 acres of the grounds were set aside in the beginning as a park area. As Matthew Vassar looked about the place in the summer of 1865, he was able to state, "The building is ready, the park has been laid out and gardens seeded and planted with shrubbery, shade trees and evergreens." The latter, consisting of white pine, arbor-vitae, and Norway spruce, were freely planted in hedgerows and groups. Many of them have gone the way of all living things, but numerous survivors of this early planting yet remain, giving to the campus a well-furnished appearance throughout the year.

Conspicuous Improvements

Alumnae of the first classes, returning now, must be amazed at the expansion and changes that have taken place. The area today is over 1,000 acres, about half of which is given over to farming, and the buildings number more than forty. The absence of the arbor-vitae hedge which screened the main campus from the highway for over half a century would surely be noticed, but farther back from the old stone wall, young pines informally grouped are full of promise for the future. The old entrance lodge was blown up in 1915 to make way for the handsome Taylor Hall, which is devoted to the study and practice of art, and houses an extensive picture gallery. The main entrance is through an arch in this building. A broad graveled driveway leads straight to Main, about 600 feet back from the street. On each side are fine old pines and spruces, through which are glimpsed wide stretches of lawn overshadowed with many fine trees.

Turning north on the crosswalk 150 feet from the main gate, we pass the front of the Frederick F. Thompson Memorial Library, a large and stately building in perpendicular Gothic style,

erected in 1905 and enlarged in 1918. About its base an arrangement of dwarf-growing evergreens gives a pleasing effect. It is interesting to note that at the time a committee was trying to decide on a site for the Library, the Board of Trustees expressed its formal opinion that "owing to the situation of Main, the Chapel, Rockefeller, and the size of these buildings, the great lawns in front of Main should never be intruded upon by buildings." This fixed the location near the highway, for which there has been no regret.

At the Library the walk divides, swinging east past the front of Rockefeller Hall to the north wing of Main, while the main line leads through the quadrangle. Rockefeller, built in 1897, is the largest classroom building. Its erection decided the quadrangular layout of future residence halls and at the same time wiped off the map the first service road. The swing of this road is shown near the Library by the two fine old arborvitae, sole survivors of the "cedar screen" behind which the coal-carts made their way from the lodge-gate to the power house in the rear of Main.

The Northern Section

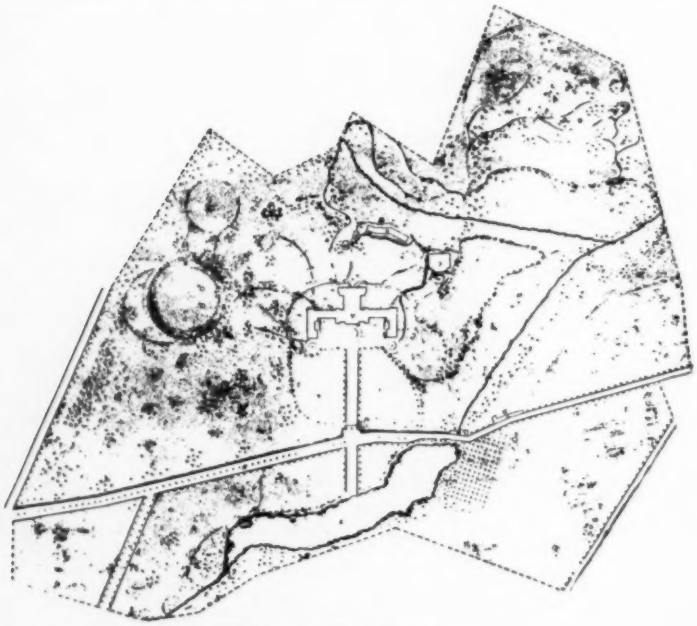
The north side of the campus was first opened in 1893 with the erection of Strong Hall, first of the residence group. Gradually the corn and potato crops disappeared from this area. Raymond Hall opened in 1897; Lathrop and Davison Halls in 1901-02, to complete the sides of the "quad." This area, 700 by 300 feet, is lined with silver maples, with other kinds of maple shading the crosswalks. Jewett Hall, built in 1907, dominates the north end with its central tower of nine stories. On a line to the west stands Josselyn Hall, opened in 1912, facing the north side of the library across a long stretch of lawn, enclosed from the street by fine old pines and spruces, with good specimens of Norway and sugar maples outstanding. Here and there groups of white and Douglas firs are coming along to fill gaps as the older trees pass out of the picture.

The northwest corner of the campus is given over to sports—tennis on clay courts, ring tennis, hockey and baseball. The northern boundary is screened with a plantation of evergreen and deciduous trees, through which are walks leading to off-campus shops and tea-rooms. On a line east of Jewett stands the Students' Building, of Southern Colonial type, erected in 1913 for the sole use of student organizations. Close by is the Athletic Circle, dear to the hearts of all who have tarried awhile at Vassar. In this secluded playground, with a greensward more than 400 feet across, students test their skill in various games from track events to shooting arrows. In the early years working the flower-beds and riding horseback around them were the chief forms of outdoor exercise. Encircled with beds and borders of hardy flowers backed by flowering shrubs, with a sheltering outer circle of large evergreen trees, it affords an ideal place where weary minds may find repose.

The East Campus

Leaving the Circle by the south gap, we come to the Gymnasium, representing the first concerted effort of alumnae on behalf of the college. Erected in 1889 and since almost doubled in size, it is inadequate for present-day needs. A little to the east are the College Infirmary, built in 1899; the residence of the physician, in 1916; and the Warden's House, dating from about the same time. The latter is a nice example of Elizabethan architecture, in an attractive setting of pine trees, with a garden enclosed by a hemlock hedge. Overlooking this group on a rocky knoll stands the Observatory, beyond which great changes have taken place within the last five years. To the north stands the handsome Cushing Hall of residence, which displaced tennis courts in 1927.

The eastern boundary was extended a few years ago by the purchase of the adjoining farm of 140 acres, and just beyond the original line a magnificent gray stone building in the Nor-



THE VASSAR CAMPUS IN 1878

The map was based on a survey made by the class of '78 under the direction of Professor Priscilla Braislin

VASSAR COLLEGE CAMPUS

1. Main Building
2. President's House
3. Chapel
4. Taylor Hall
5. Frederick Ferris Thompson Memorial Library
6. Rockefeller Hall
7. Raymond House
8. Strong House
9. Eliza Davison House
10. Edward Lathrop House
11. Olivia Josselyn House
12. Tennis Courts
13. Hockey Field
14. Milo P. Jewett House
15. Students' Building
16. Cushing House
17. Nursery School
18. Minnie Cumnock Blodgett Hall of Euthenics
19. Warden's House
20. Astronomical Observatory
21. Alumnae Gymnasium
22. Metcalf House
23. Swift Memorial Infirmary
24. Laundry
25. Service Building
26. Power Plant
27. Power Plant Engineer's Office
28. Concrete Tennis Court
29. Boiler House
30. Goodfellowship Club House
31. Eleanor Conservatory
32. Assembly Hall
33. Sanders Laboratory of Chemistry
34. Outdoor Theater
35. Henry M. Sanders Laboratory of Physics
36. Shakespeare Garden
37. New England Building
38. Vassar Brothers Laboratory
39-42. Faculty Houses
43. Belle Skinner Hall of Music
44. Georgia Avery Kendrick House
45-60. Faculty Houses
61. Williams House
62. Alumnae House
63. Faculty House
64. Athletic Circle
65. Proposed Gymnasium and Sports Building
66. Field House

THE VASSAR CAMPUS TO-DAY

This map does not show the farm area to the south which is owned by the college

SKINNER HALL OF MUSIC FROM THE SHAKESPEARE GARDEN

man style was erected in 1928. This is the Blodgett Hall of Euthenics. Just below is a smaller building of similar stone, the Wimpfheimer Nursery School, built at the same time. This has facilities for 30 children, and affords opportunity for child study.

To the north is the site for the new gymnasium and sports building for which funds are now being sought. The view east from this section extends to Sunrise Hill, the present line, across the rolling fairways of a nine-hole golf course laid out in 1930. Coming back to the old boundary line, the path leads back of the Observatory to Caspar Creek. On the slope to the right, until recently cluttered with brambles and weeds, is a lilac collection, part of an arboretum of ornamental woody plants which is being established on the grounds.

The South Campus

Turning south, the way leads past the service buildings. The original system was adequate until 1910, when a new heating and electric power plant was installed; it has since been enlarged to meet the growing needs. Just beyond, the creek expands into the shallow water of Sunset Lake, at which point the road crosses a bridge and extends up over the rise called Sunset Hill, crowned with evergreen trees. This road gives access also to hockey and lacrosse fields and the golf course. In this area young conifers in variety are being planted as part of the arboretum scheme. The west slope of "Sunset" was planted with a collection of flowering crab-apples five years ago, to take the place in the landscape of the old orchard higher up, as its occupants bow to the inevitable. Daffodils in variety are scattered all over the grassy slope to make a spring picture that will increase in beauty for years to come.

On the west side of the lake the walk leads back of the Outdoor Theater, from which we look up the slope on which an audience of 3,000 can be seated. Encircled with evergreen trees, with the lake in the stage background, many attractive plays and pageants have been presented here since 1915.

Passing on, we come to a small stream overflowing from the former Mill Cove Pond, now Vassar Lake. A rustic bridge here gives access from the campus to the vegetable and cut-flower garden and greenhouses on the higher ground. A little below the bridge, the stream, with rhododendron-fringed banks at this point, joins with the overflow from Sunset Lake and flows on through the Glen, a wooded area of several acres which could be made into an ideal bird and wild-flower sanctuary. West from the bridge we cross a gentle slope and salute the finest tree on the grounds, a magnificent white oak with branches spreading 125 feet, already a well-grown tree when Matthew Vassar bought the place. This favored slope, sheltered from north winds by a fine belt of evergreens, will be a colorful spot when a collection of azaleas, just planted, is in flower.

Passing on through an enclosure of hemlock, we are in a little garden of the old English style known as Shakespeare Garden, established in

THE "CIRCLE" IN JUNE

YOUNG DOUGLAS FIRS PLANTED TO REPLACE DYING NORWAY SPRUCES, NEAR THE "CIRCLE" AND STUDENTS' BUILDING

1916 through the joint efforts of students in the Shakespeare and botany classes. On the other side is a stretch of low meadow, now in process of development owing to the erection on the slope across the stream of the Belle Skinner Hall of Music, opened in 1931.

Turning north, the incline leads to the science group. The oldest building is the Vassar Brothers Laboratory, built in 1879, the first new structure after the original three. It was occupied by the department of physics until the opening of the more modern Sanders Laboratory of Physics in 1926, directly back of the old building. On the east side stands the Sanders Laboratory of Chemistry, and on the west, the New England Building, a gift of New England alumnae in 1901. The New England Building houses the departments of zoology, botany and geology, and the natural history collections.

The Central Section

We now come to the southwest corner of Main, close to the President's house, built in 1896. Going west past the front of his house, a broad elm-shaded walk leads to the Chapel, a beautiful stone building in the Norman style, built in 1904. It was the gift of two devoted alumnae, Mrs. Mary Thaw Thompson and Mrs. Charles M. Pratt. The lawn on the west side was recently raised and the bareness relieved by planting; English beech and Japanese yew are featured. From the front of the Chapel a broad walk leads straight to the point on the main drive where we first turned to the library.

Crossing the highway from the main gate, paths lead through a planting of native trees and shrubs, filling a gap in "Faculty Row," to the old walk around Vassar Lake, connecting at the landing platform, the only evidence now seen of the boating days of long ago. The rough ground between the faculty houses and the lake is incorporated in the arboretum area and can be made into an attractive park-like place. The "Rock Lot," opposite the northwest corner of the old campus, was opened up in 1922 with the erection of Williams Hall, the first faculty apartment house. Two wings were added in 1925. In 1924, the trails over the rocky knoll, made by generations of village school children, were eliminated by the erection of the imposing Alumnae House, a club-house and educational center for alumnae and their guests.

A Fifty-Year Plan Advocated

Such is the Vassar campus as it appears today. Neither Matthew Vassar nor the staunchest friends of his experiment in the education of women could have foreseen the great development that has taken place; consequently, no long-time plan was thought of. In summing up at the end of his long term of service in 1914, President Taylor said: "No institution should enter upon building without a thorough study of the possibilities for fifty years. Built without such a plan, the Vassar campus is a fortunate result, on the whole, gained by a steady hold by a few men and women who worked many years together, on a half-recognized vision with a whole-hearted and unselfish purpose."

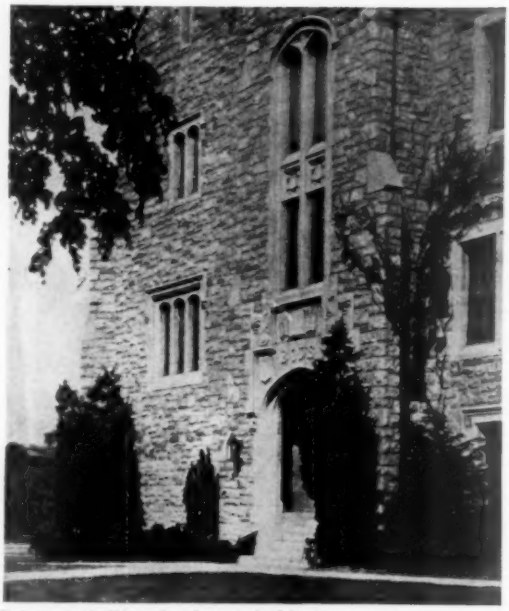
A VIEW OF THE SHAKESPEARE GARDEN

The Landscape Architect, the Architect, and the School

By L. W. BRIGGS
Briggs & Stelling, Landscape Architects, New York, N. Y., and Charleston, S. C.

EVERY public building stands as an example of the culture and intelligence of the community, and no building more so than the school. Not only should the citizen be able to point to it and its grounds with pride, but to the pupils the group should express rightness and beauty. They should enter it with the feeling that it is a cheerful and pleasant place. The school itself should foster the appreciation of fine things, which is part of education.

School boards are wisely calling more and more on architects of recognized ability to design the buildings so that they will have, in addition to an efficient interior arrangement, architecture of beauty and character. Even wiser are the boards which also engage a qualified landscape architect, for similar reasons; but wisest are the boards which bring the architect and the landscape architect together at the very beginning of a project. Although their work is quite different, there is such a close relationship between a building and its grounds that cooperation between the architect and the landscape architect from the start is essential for the complete success of either's work. Not only does cooperation lead to artistic harmony, but many economies are effected.



Briggs & Stelling, Landscape Architects
Tooker & Marsh, Architects

THE SOUTH WING OF THE MEMORIAL HIGH SCHOOL, PELHAM, N. Y., SHOWING EFFECTIVE USE OF PLANT MATERIALS

The Advantages of Cooperation

Even as early in a program as the selection of the land, the combined advice of the architect and the landscape architect can be of great value. Together they can visualize the completed work and also anticipate the effect on the construction of the advantages and disadvantages of the property under consideration. Among the questions which frequently should be considered at this time are those concerning drainage; the amount of excavation and fill involved in the work; rock removal; the shape and size of the lot in relation to building location; proposed playfields; and future extensions. Inferior land, although purchased at a low price, might easily absorb so much money in additional construction required that the final total cost would exceed that of the same unit on a superior piece of property. An ounce of professional advice in time is often worth many pounds of cure.

Following the acquisition of the land, the problems which concern both the architect and the landscape architect are the location, shape and type of building. In general, its position should allow a maximum area available for playfields, and also permit sufficient setback from the street for good appearance. The plan of the school should be determined with due consideration of the landscape architect's suggestions concerning the best places for playfields, drives and service court. Collaboration in these matters is very important to the proper relationship of the interior and the exterior. For example, when the development of the grounds is not considered, the service section is frequently so located that unnecessarily long and unsightly roads must be made to reach them, in many cases destroying the availability of part of the grounds for games or beautification. The grade of the foundation line is another matter in which the recommendations of the landscape architect and the architect should be considered together. It has direct influence on drainage, the grade of lawns, playgrounds, walks and drives, and on the appearance of façades. The proper fixing of the grade for the building will save considerable cost through the economical disposition of cut and fill.

The Landscape Architect's Plans

After the general relationship between the building and the grounds has been worked out by the architect and landscape architect in cooperation, each can proceed with his own plan,

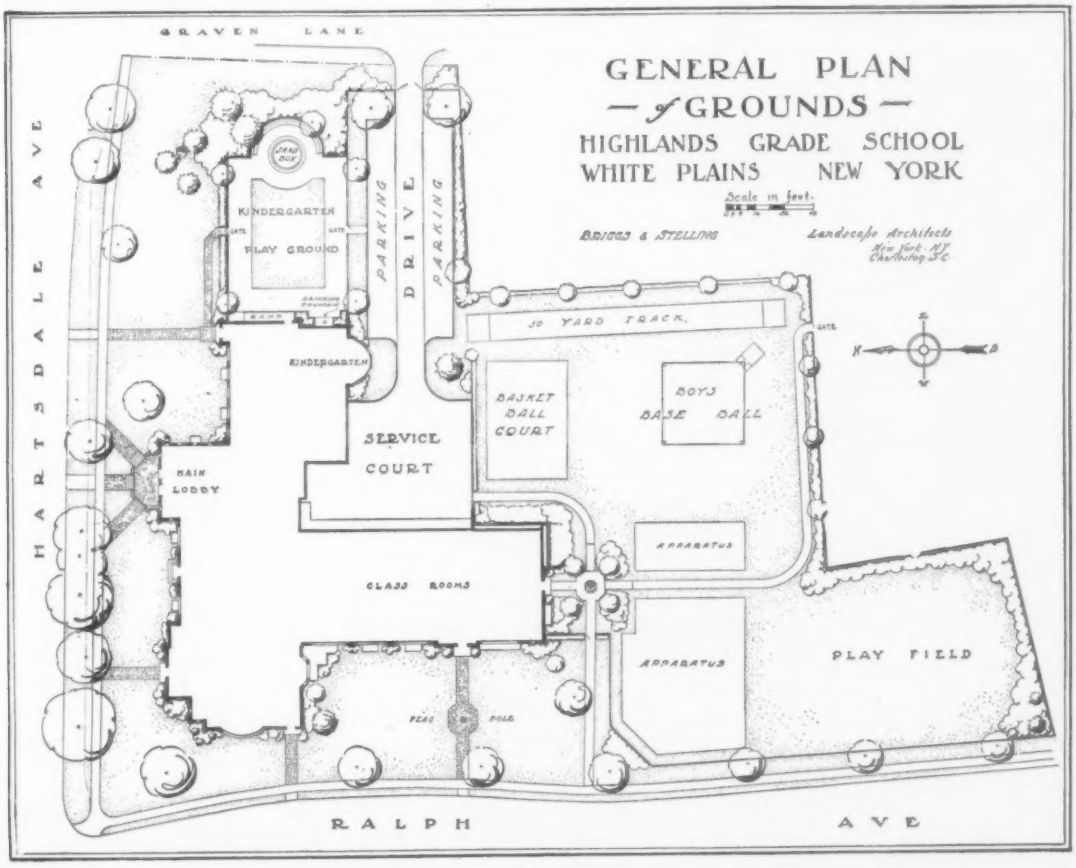
knowing that in the end the two will combine to make a complete and satisfactory school unit. Minor points arise from time to time during the planning which the two professional advisors can discuss to mutual advantage and solve before the work involved is started. Such matters would include the location of the fuel oil tank, if one is called for; window areas; basement steps; and hose bibs on the outside walls for watering the planting.

The first drawing to be prepared is the general plan, showing in a clear and easily understood manner the landscape architect's idea of arrangement. It will be based on the conclusions arrived at in consultation with the board and the architect. It should be drawn to scale and should show enough detail so that every part is clear and easy to understand. After this preliminary plan has been discussed and approved, with whatever changes may have seemed desirable, the final grading and construction drawings, with all necessary details, are made. Also, to accompany them, are prepared a set of specifications. Following these comes the planting plan with its specifications and lists of plants to be purchased.

Some boards make the great mistake of placing the landscape work directly in the hands of a contractor, without professional advice or drawings, chiefly because proceeding without a plan, or the use of the so-called "free plan" offered by some contractors, appears to represent a saving. The engineering and artistic quality of such work, however, is frequently inferior and gives no opportunity for competitive bidding. Not only do accurate professional drawings and specifications show the board exactly what it is getting, but also insure the lowest cost by permitting a number of estimates.

A Concrete Example

The landscape arrangement of the Highlands Grade School in White Plains, N. Y., the general plan of which is used as an illustration for this article, was developed in collaboration with the architects for the school. As a result of numerous conferences during the preparation of the drawings, a very satisfactory relationship between the building and the grounds was worked out, and considerable simplification of construction work effected. Playgrounds were made accessible to the classrooms they serve, the service area is compact and convenient to the corresponding interior arrangement, and the foundation lines and lawn grades have been adjusted to allow ample drainage with a pleasing slope.



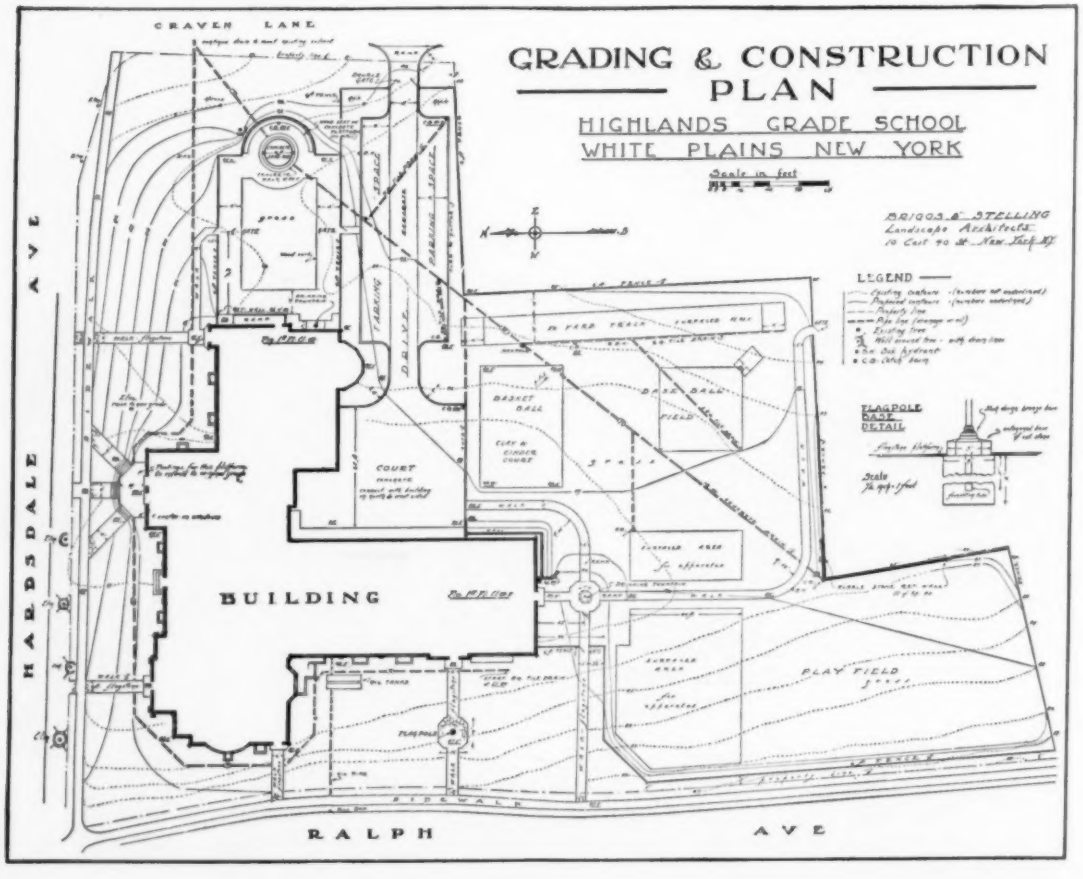
Wherever possible, drain pipes for the playfields were enlarged to accommodate the drainage requirements of the building, in order to avoid the expense of separate lines. The fuel oil tanks, supply line and fill box were placed where they would not only function properly, but would not interfere with future planting. Basement window areas of necessity frequently prevent desirable planting, but if an adjustment is practical, the landscape architect and the architect can usually work out a compromise, thereby making it possible to enhance the appearance of the building by a pleasing planting.

Economies Effected

Several such problems came up in connection with the White Plains School. At the very start of the work, one of the benefits of having the grounds plan completed at the same time as the building plans, was realized. Trees which were growing within the foundation lines were noted in the landscape architect's drawings, and those suitable for transplanting were relocated on the final plan. This made it possible not only to utilize these trees but also to put them in their permanent location with one operation. There is also an advantage in permitting the general contractor for the building to include grading and outside construction work in his bid, since he can figure this work lower if it is done in connection with the main contract.

Planting Considerations

Plants for school grounds should be chosen for their hardiness, toughness, freedom from disease, and neat manner of growth. In addition, the habit of growth of each plant with relation to its position must be carefully considered in view of the future, so that it will not have to be removed in a few years. The planting phase of landscape work has usually been regarded as simply an artistic matter; its economic importance has not been realized. For instance, when the lines of a well-designed building are marred by badly arranged planting it not only is inartistic but represents actual financial loss: partly destroying the architectural beauty of a building certainly decreases its value, and paying for excessive shrubbery to do it is added waste. Harmonious planting will enhance the appearance of good architecture, and in the case of poorly designed buildings some of the sorest spots may be wholly or partly healed by the skilful placing of trees and shrubs.



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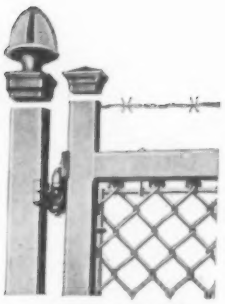

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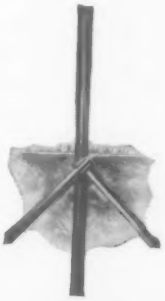
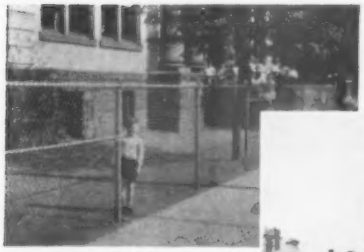
ANCHOR SQUARE TERMINAL POST

ANCHOR U-BAR LINE POST



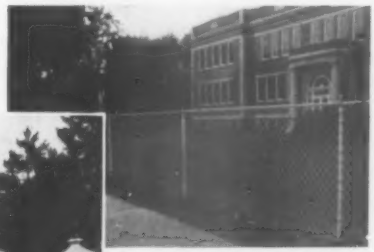
ANCHOR DRIVE-ANCHORAGE

Write for Catalog No. 73
"Anchor Nation-Wide Fencing Service"



ANCHOR CHAIN LINK FENCE

ANCHOR-WELD DOUBLE DRIVEWAY GATE



ANCHOR CHAIN LINK FENCE

COLDWELL LAWN MOWER COMPANY

Newburgh, N. Y., U. S. A.

Since 1867 Coldwell Dependable Lawn Mowers have been contributing in a large measure to the development and maintenance of beautiful Lawns throughout the entire civilized world. Successive improved models have been developed to meet the varying conditions in the different sections of the country; keeping in mind constantly the importance of strict adherence to the original Coldwell policy; to provide at all times a **thoroughly dependable** lawn mower and a size and style suited for every lawn mowing and rolling problem.

ROLLING AND MOWING ON STADIUM AT UNITED STATES MILITARY ACADEMY, WEST POINT, NEW YORK

"L"-TWIN WITH GANG ATTACHMENT, CUTTING 60-INCH SWATH ON GROUNDS OF MT. SAINT MARY'S ACADEMY

The large lawns and athletic fields now so common a sight in connection with public schools, universities and colleges require special thought and care if they are to be kept beautiful and efficient and thus reflect the proper atmosphere of the setting.

The value of a light rolling with each successive mowing has long since been recognized. It helps to control dandelions and other lawn pests, firms the soil around the tender grass roots, helps to conserve moisture, irons out the surface and produces a fine velvety finish to the turf. The successive rolling of baseball, tennis and other athletic fields is, of course, essential to the development of a smooth playing surface.

EXTREME FLEXIBILITY PERMITS OF CLOSE TRIMMING

The Coldwell Power Lawn Mowers and Rollers are especially well adapted for the use of schools and colleges. Being equipped with **full width drive rollers,** they may be used for **combined rolling and mowing,** or for **separate rolling** only. The principal weight of the machine is carried on the roller which prevents marking and permits of trimming clean along walks and driveways. The use of hand mowers for trimming is practically eliminated.

The brief description of the various models on the opposite page will aid you in the selection of the "Coldwell" best suited for your grounds.

Let us send complete details or arrange with nearest Coldwell distributor to demonstrate.

"TWIN THIRTY" WITH RIDING SULKY ON HIGH SCHOOL GROUNDS

"Twin Thirty"

Rolls and **mows** simultaneously six to eight acres per day. Has full 30-inch, two-section drive roller with differential between rollers to prevent marking and make turning easy. 30-inch, 5-blade cutter.

Equipped with **two-cylinder,** four-cycle, water-cooled motor which provides an abundance of reserve power, is free from vibration and noise and will develop maximum power continuously in hottest weather without overheating.

Riding sulky for the operator, also grass catcher may be had as extra equipment.

Extremely useful where athletic fields are to be maintained.

"L" Twin

Rolls and **mows** simultaneously four to six acres per day. Full 25-inch, two-section drive roller with differential. 25-inch, 5-blade cutter.

Two-cylinder, four-cycle, water-cooled motor supplies unusual reserve power.

This model may be had with the two 20-inch auxiliary gang units which increases the swath to 60 inches and more than doubles the capacity. Very useful for the wide open stretches of lawn.

In the "L" Twin is combined extreme flexibility for trimming and terrace work; a 25-inch combined mower and roller or separate roller and, with the gang attachment, a mower of exceptionally large capacity.

Riding sulky for the operator, also grass catcher may be had as extra equipment.

"L" Junior

Rolls and **mows** simultaneously four to six acres per day. Full 25-inch, two-section drive roller with differential. 25-inch, 5-blade cutter.

A powerful, single-cylinder, four-cycle, water-cooled motor drives this light-weight mower and roller, furnishing plenty of power for use on grades and in tough grasses. Simple and sturdy in design and construction and moderate in price. Thoroughly dependable and extremely economical in operation.

Grass catcher may be had as extra equipment.

"Cub"

Rolls and **mows** simultaneously three to four acres per day.

Full 21-inch, two-section drive roller with differential. 21-inch, 5-blade cutter.

A light weight, simple, economical and dependable power mower and roller at a very moderate price. Especially well suited for lawns surrounding the smaller schools and also very useful for trimming and cutting the small plots on the larger campuses.

Equipped with a 4-cycle, water-cooled motor having unusual power for the size and weight of the machine. Unexcelled for hilly lawns.

Standard Features in All Coldwell Models

Full-width drive rollers
Four-cycle, water-cooled motors
All machines complete, including the motor, designed and built in the Coldwell factory
Timken tapered roller bearings throughout
Tillotson Automobile Type Carburetor
Alemite-Zerk force feed lubrication
Oil tempered, self-sharpening blades
Automatic spring loaded clutches require no adjustment
Three Speeds—Low, Normal and High
Combined rolling and mowing, or separate rolling when desired
Thoroughly dependable, trouble-free, economical operation over a period of years

A large selection of styles and sizes and at prices assuring the greatest possible value

The Gang Lawn Mower

Consists of five 21-inch mowers that mow a swath 96 inches wide. Designed especially to withstand the strain and hard wear of a tractor-drawn outfit. Amazingly sturdy, yet exceedingly flexible on hilly or uneven ground. Furnished with three-unit gang (60-inch cut), or a five-unit gang (96-inch cut).

A Complete Dependable Line of Hand, Horse and Power Lawn Mowers

SINCE 1867

COLDWELL

***DEPENDABLE* LAWN MOWERS**

Hand—Horse—Gasoline—Electric

DAYTON IRRIGATION SYSTEM, INC.

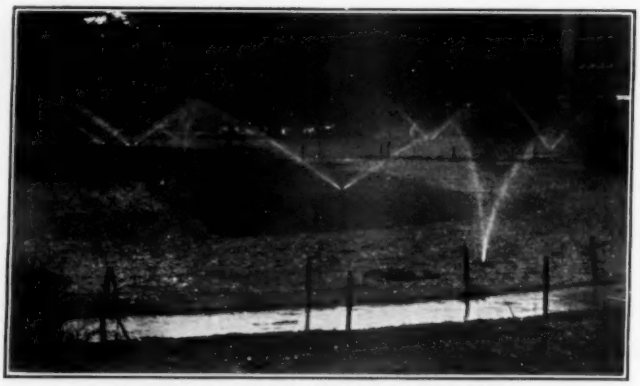
143–151 East Post Road, White Plains, N. Y.

Rain Regulation That Pays for Itself in Athletic Fields, School Grounds and Campuses

Never was so complete a solution to effective irrigation available to colleges and institutions. The principle of man-directed moisture is far from new. But a new application of that principle is changing the entire concept of its value.

When, several years ago, Dayton Irrigation engineers had perfected their new underground system, they immediately were charged with two additional problems. They were instructed to so reduce its cost as to make the system **pay for itself** no matter how large or small the place in which it was to be installed. And they were to make it—notwithstanding its lower investment cost—deserving of an **unqualified guarantee** as to efficiency for **three years** from date of installation.

The previous paragraph is of vital importance to all authorities at schools, universities and similar institutions on whose shoulders the matter of grounds management has been laid. If irrigation is to justify its investment, it **must** pay for itself out of its savings of other costs. And there can be no possible question as to its permanency.



THREE WEEKS STAND OF TURF

Illustration from an unretouched photograph, showing the rich, luxuriant grass on Dayton irrigated grounds, three weeks after initial planting. Turf surrounding the darker patch has been cut to show by contrast how healthy, lush, the stand has grown. Grounds are those of Rye Neck School, Mamaroneck, N. Y. (First cost of this turf was negligible . . . and no reseeding, no further expense or labor of any sort was necessary.)

All this implies the choice of a system distinctly honest—backed by highly competent engineering skill and maker-integrity. And such a system—pridefully—is Dayton Irrigation. Hundreds of installations are evidence of its investment merit, both as to efficiency and long-lasting economy.

The illustration on this page is self-explanatory. Either copper or galvanized pipe (optional), a few inches below the surface, conveys the water and conveys it without leak loss, too, thanks to newly developed joints. When the water is turned on, each of the properly placed sprinkler heads rise from the turf, and the rotary arms also rise, swirling their **exactly simulated** rain high into the air over the surface to be irrigated. It deserves reiteration that this is rain—gentle, consistently right rain—and not drifting mist or torrential downpour.

Each of these Dayton rotary rainmakers is rust-proof, stick-proof, frost-proof. They vary in size from stationary spray heads, full or part circle, up to 100 feet diameter. Distribution of water per square foot is practically the same with any size head. An efficient and economical system can be designed for any given pressure. Since its character so perfectly matches the natural element, like rain, the water that descends has the positive penetration necessary to open the pores of the turf for entrance.

A natural question may here arise as to the condition of the turf surface when Dayton sprinklers are not in use. Again the illustration is revealing. Metal top sinks flush with solid ground. In playgrounds, athletic fields and other special areas, sprinkler head is concealed by semi-solid rubber plug, vulcanized to metal top, flush with solid ground when not in use. There is positively no danger to players of any types of games. Hence it is understandable that there never is interference with rolling or cutting of turf—games go on, the players never conscious of the presence of the sprinkler system beneath.

This summarizes the story of Dayton Underground Irrigation. The effect, the results in turf welfare, hardly needs comment. Grass is lush, healthier, even through the most protracted hot spells—and trees, shrubs, flowers, gardens in the

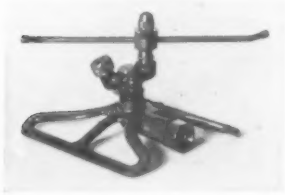
zones of Dayton moisture are richer for the regularity of this ideal rain.

There likely will be many a question peculiar to the reader's own professional problem which he may wish to discuss. The services of Dayton engineers are available at all times with neither cost nor obligation to the inquirer. And plans, particularized to the property, estimates also if desired, are provided without charge.

CORRESPONDENCE IS WELCOMED
Problems Gladly Discussed—Ask—Without Concern as to Obligation or Embarrassment

These, Too, Are DAYTON Irrigation —for Lesser Jobs of Turf Health-Maintenance

DAYTON THREE-WAY ROTARY—$4.00



Three separate outlets delivering different streams. Coverage 48 feet diameter at 25 pounds pressure. Skid base. Adjustable outlets for varying coverage

DAYTON MASTER VIBRO-ROTARY—$12.00

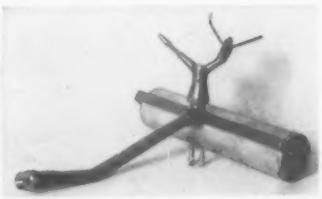
Another low pressure sprinkler of unusual capacity. Coverage 80 feet at pressure of 35 to 40 pounds. Roller base. Available for ¾ or 1" hose, as desired. Main stream adjustable while in operation

DAYTON LAWN VIBRO-ROTARY—$6.00

Sled base—the Dayton-devised base which cannot track or score the youngest of turf. Coverage 75 feet on so little as 35 pounds pressure. Fully adjustable. For ¾" hose

DAYTON GREENWAY—$14.00

Single stream, but with extraordinary coverage. Recommended for pressure of 50 pounds or over. A maximum circle of 150 fect can be obtained with high pressure. Two extra nozzles for varying stream length and character.

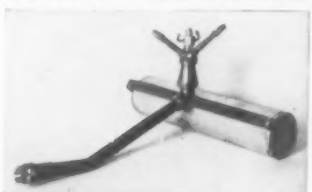


Optional skid or roller base, ¾ or 1" hose connection.

DAYTON JUNIOR VIBRO-ROTARY—$10.00

In every respect identical with the Dayton Master Vibro-Rotary. Single distinction being equipped with skid base instead of roller base

DAYTON GOLF GENERAL—$16.50



Twin streams of this heavy-duty sprinkler rotate slowly, covering 135 feet. Large roller base with connections for ¾ or 1" hose. Operates on pressure of 50 pounds or more. Two extra nozzles are provided permitting either coarse or fine stream as desired

SPECIAL DISCOUNTS TO SCHOOLS AND INSTITUTIONS

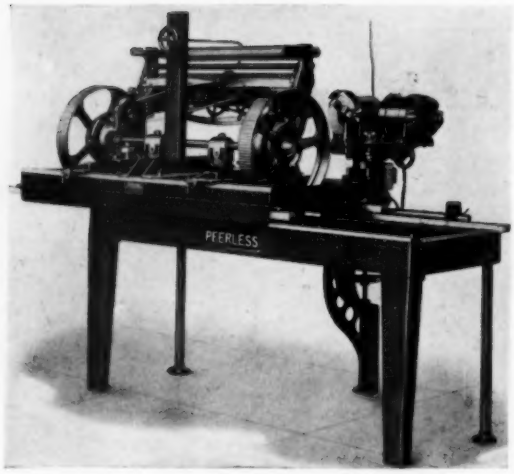
The prices of these various Dayton Rotary Sprinklers would seem to infer far less of ability. Yet, utilizing the same advanced engineering principles Dayton experts have developed for the Dayton Underground Irrigation System, each delivers capacity amazingly efficient for such a device. Consider please that they have no gears, no motors, no turbines. They cannot rust or stick or clog. Their joints are leak-proof. They cannot waste water or dissipate pressure and they do not puddle or flood. Each is built to a fixed standard of performability. None is made to meet the market circumstance of mere price. Fully guaranteed. It is recommended that in selecting them, water pressure available and coverage required be borne in mind.

Detailed Descriptive Literature of Dayton Sprinklers Available on Request

THE FATE-ROOT-HEATH COMPANY

932–968 Bell Street

PLYMOUTH, OHIO



PEERLESS
Mower Sharpener

The new Model D Peerless Mower Sharpener grinds all makes and types of power-driven, fairway and putting green mowers, as well as hand lawn mowers, without removing the mower wheels or reel knives. It grinds the blades with amazing speed and accuracy, with the proper clearance behind the cutting edge, makes the mower run easily and lengthens the life of the mower. By means of a guide in contact with the bed knife the reel knives can be ground to fit the bed knife perfectly, even though the bed knife is bent or sprung.

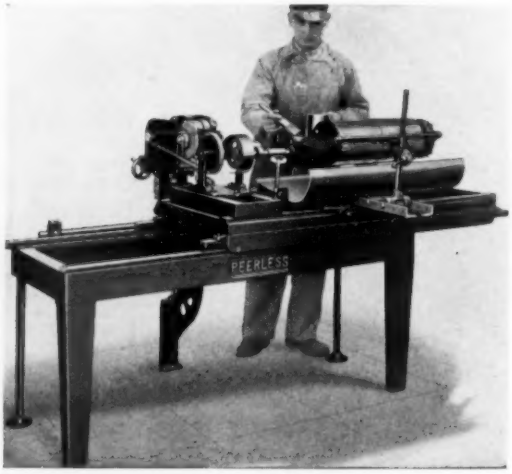
While extremely accurate, the Peerless is simple to operate. Place the mower in the machine, make a few simple adjustments and proceed to grind. In a few minutes you have a keen-cutting, easy-running mower, with every blade ground exactly alike. No more tearing of turf—grass is **sheared** off, not pulled out by the roots.

General Description

The bed or frame is a one-piece box section heavy casting, mounted on three heavy cast iron legs and two steel supporting posts.

The carriage has a travel of 42 inches and, rolling on steel balls, requires only a slight pressure for feeding the work along the grinding wheel, eliminating all feed mechanism.

The grinding head carries a 6-inch grinding wheel driven by a ⅓-hp. motor by a "V" belt. This makes a smooth, quiet and compact drive.



PEERLESS MOWER SHARPENER
With Reconditioner Attachment

A Reconditioner Attachment can be furnished as shown above, at an additional price, for "lapping in" mowers after they have been ground, or for reconditioning slightly dull ones, with grinding compound or emery paste. On putting green mowers this is of the utmost importance.

The Attachment consists of a belt-driven geared speed-reducer unit driven by the motor; an adjustable roller support to raise and lower the reel shaft; two steel driving couplers and five pounds of grinding compound.

The Attachment can be quickly clamped to the carriage of the Sharpener by means of two clamps (furnished). The Speed-reducer Unit is mounted on a sliding base, which gives a horizontal adjustment, the vertical adjustment being obtained by the adjustable roller support.

The Peerless Reconditioner Attachment will pay for itself several times over every year, and at the small additional price should be ordered with every Peerless Sharpener.

Dimensions, Weights, Etc.

Bed, length	5 feet
Bed, width	20 inches
Space required for 42-inch travel of carriage	8 ft. 8 inches
Width over all	42 inches
Height to top of carriage	31½ inches
Height over all	48 inches
Net weight without Reconditioner Attachment	820 lbs.
Net weight with Reconditioner Attachment	880 lbs.
Shipping weight without Reconditioner Attachment	935 lbs.
Shipping weight with Reconditioner Attachment	1000 lbs.

Write for Catalog and Prices

IDEAL POWER LAWN MOWER COMPANY

438 Kalamazoo Street, Lansing, Mich.

FACTORY BRANCHES

413 West Chicago Avenue, Chicago, Ill.
237 Lafayette Street, New York, N. Y.
161 Vester Street, Ferndale (Detroit), Mich.

CANADIAN DISTRIBUTORS: Aikenhead Hdw., Ltd., 17 Temperance Street, Toronto, Ontario

Dealers in All Principal Cities

THE JUNIOR TRIPLEX

There is no more valuable mower for school and university grounds than the Junior Triplex. Because one man with the "Junior" can smoothly cut as high as 25 acres in one day, this new mower can soon pay for itself in time and labor saved.

A little smaller than the famous Triplex — the Junior Triplex is even easier to handle, costs less, and does almost as much work per day.

There is no other type of mower on the market that can equal the Triplex family. Can be handled with astonishing ease. The Junior Triplex backs up, turns around in its own length. For crossing roads or rough ground, the cutting units can be raised, from the operator's seat.

This agile mower cuts around trees and bushes—cuts close to walls and walks. For the treed and foliaged campus, the Junior Triplex is a real economy. *Note these users of the Triplex:* University of Syracuse, University of Buffalo, Smith College, U. S. Naval Academy, Purdue University, Mt. Vernon Seminary, *and many others.*

Details: 10 hp. powerful, smooth-running engine. Cuts 70-inch swath. 3 famous Bulldog cutting units.

THE NEW IDEAL JUNIOR TRIPLEX

POWER MOWERS

Ideal now offers more than six types of power mowers—the world's most complete line. Two sizes of Wheel type—two sizes of Roller type—and two sizes of the new "Majestic," finer, smoother-cutting mowers with power-driven roller.

For every school mowing job there is an Ideal mower to give maximum cutting efficiency.

Powered to conquer hills, and to slow down for corners without stalling. Write for prices and new illustrated catalog giving details on the complete Ideal line of grass cutting equipment.

IDEAL 25-INCH WHEEL TYPE MOWER

IDEAL "MAJESTIC" POWER MOWER

JACOBSEN MANUFACTURING COMPANY

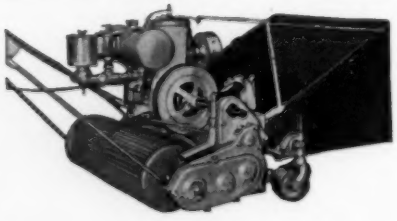
740 Washington Avenue
Racine, Wisconsin

The "4-Acre" Heavy-Duty Mower

SHOWING THE "4-ACRE" MOWER FITTED WITH RUBBER TIRES

This sturdy, 24-inch, general-purpose mower, used by thousands of schools and institutions, is the oldest of the Jacobsen line. Its powerful Jacobsen-made motor and heavy construction give it a capacity of 4 to 5 acres a day of the most grueling work. Equipped with instantaneous mechanical starter, separate reel and traction clutches, auto-type differential and rear guide-wheel for easy turning. Enclosed, automotive gear-drive running in oil is an exclusive Jacobsen refinement which doubles the life of the mower. Rubber tires, sickle bar attachment for weeds, and riding sulky, optional equipment.

"Estate" Roller-Drive Mower



This mower does more than cut the grass. Its large rear rollers smooth the lawn. Furthermore, the rollers protect the delicate turf, leaving a true velvety finish without scuffing or denting. It is preferred where an extra fine lawn is desired. The "Estate" Mower has every Jacobsen refinement, including enclosed, oil-floating gears, auto-type differential and separate reel and traction clutches that are asbestos-lined and will not slip. Built in two sizes—24 and 30-inch cutting widths. Equipped with specially designed motor as used in the Jacobsen "4-Acre" model. A quality mower throughout.

The New Simplex 20-inch Mower

A new product of Jacobsen engineers who offer it as their solution of the problem of "mowing smaller lawns at smaller cost." While low in cost, it is a typical

THE NEW JACOBSEN SIMPLEX 20-INCH MOWER

Jacobsen high quality product. Cuts two acres in eight hours, and can be handled by anyone with ease. Powerful, easy-starting high-compression motor; tempered steel cutting unit with safety clutch. Enclosed transmission gears running in oil, and bevel-gear differential enabling mower to turn under its own power. Owners of medium-sized lawns and school and park boards are purchasing this mower because it has features usually found only on high-priced mowers.

Other wheel and roller-type Jacobsen power mowers at $150 up include the new 32-inch twin-cylinder heavy-duty model which, with gang attachment, can cut 2½ acres an hour. Also the famous Jacobsen putting green mower, the true money-saver for golf courses. Write for catalog. Sales and service everywhere.

THE MOTO-MOWER COMPANY

MAIN OFFICE

4600 Woodward Avenue

DETROIT, MICHIGAN

ANNOUNCING MOTO-MOWER'S GREATEST ACHIEVEMENT— THE SUPER-DETROIT

The SUPER-DETROIT model MOTO-MOWER challenges performance comparison with any grass cutter regardless of size or cost. Its motor, used exclusively on the SUPER-DETROIT, develops two horsepower. Its sturdy, well-balanced construction promises years of efficient, trouble-free grass cutting under all conditions with lowest maintenance expense. Because the SUPER-DETROIT can cut 5 acres of lawn on one gallon of gasoline every day, it is highly recommended for park and public building grounds work.

A TWIST OF THE WRIST GUIDES IT

The famous "twist of the wrist" guiding principle which makes MOTO-MOWERS so easy to steer is a SUPER-DETROIT feature. This remarkable machine also possesses Selective Automatic Speed Control, which enables it to retain the same cutting speed no matter how smooth or rough the going. Its new universal joint takes all the strain off the motor bearings, insuring better performance and longer life. The SUPER-DETROIT is a de luxe machine in every way, and unquestionably the best power lawn mower buy on the market.

THERE'S A MOTO-MOWER SIZE FOR EVERY LAWN

For very large lawns, MOTO-MOWER manufactures their 3-WAY model, which, when equipped with trailers, cuts a 60-inch swath, twenty acres a day, on two gallons of gasoline. If your requirements demand cutting only 3 acres a day, the CITY model, 21" cut, is recommended. A twist of the wrist guides these machines. For smaller lawns, the JUNIOR model MOTO-MOWER, 18" cut, is the finest and most economical machine made.

Specifications of the SUPER-DETROIT Model MOTO-MOWER

Width of cut, 27"; cutting adjustment, ½" to 3½"; cutting speed, ½ to 3½ m.p.h.; cutting capacity, 3 to 5 acres per day; climbs 35% grade; gasoline consumption per day, about 1 gal.; weight (net), 310 lbs. (crated for shipment), 375 lbs.; color, gray enamel. **Motor**—four-cycle, valve-in-head, air-cooled; bore, 2¾"; stroke, 3¼"; horsepower, 2; speed, 1800 to 2400 r.p.m.; parts to lubricate, 1 place; control, automatic governor for speed control; ignition, magneto; carburetor, Tillotson. **Mower**—blades, revolving, 5 crucible steel (tempered); bottom blade, turned-up edge (tempered); clutches, dry disc-type; control, wheels can be engaged either together or separately; reel bearings, Shafer, self-aligning; handle, tubular steel; side frames, malleable iron; chains, diamond roller; drive wheels, 14". Two types of sulkies available.

There's a Moto-Mower Dealer Near You

Moto-Mower TRADE MARK

Write for Our Complete Catalog of Moto-Mowers

NAPERVILLE NURSERIES

Growers and Distributors of

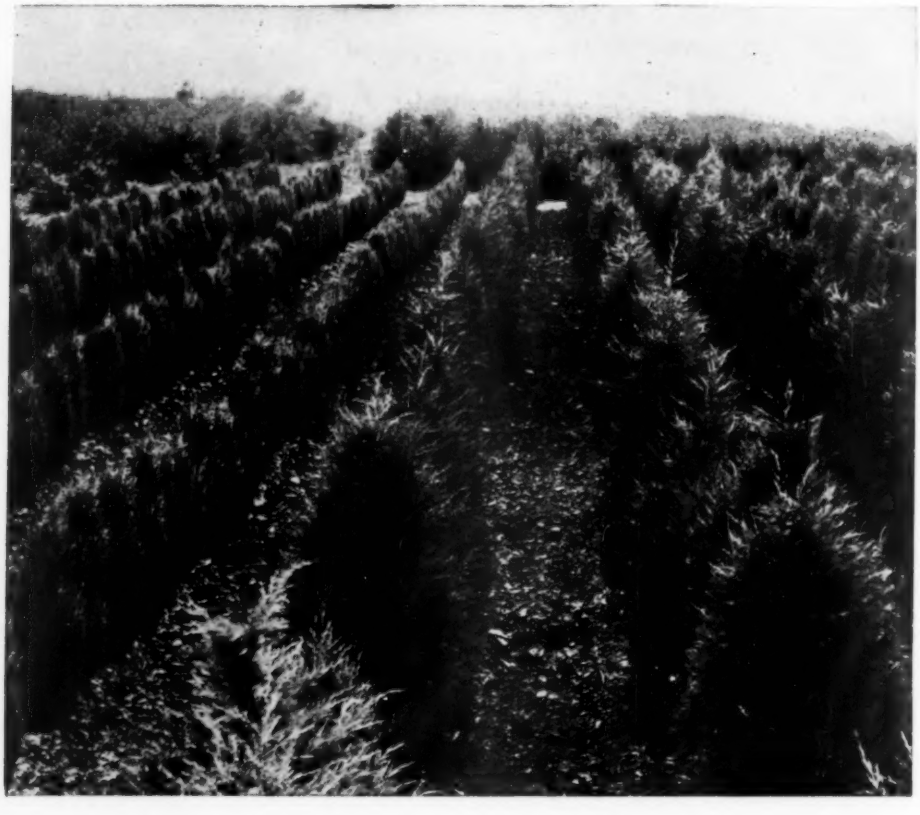
Ornamental Trees, Shrubs, Vines, Evergreens, Perennials and Rock Garden Plants

For Parks, Golf Grounds, Country Clubs, Estates, Cemeteries, Subdivisions, Landscape Plantings, Horticultural and Forestry Projects

NAPERVILLE (Du Page County), ILLINOIS

28 MILES WEST OF CHICAGO ON STATE ROAD 18 (OGDEN AVENUE)

Established 1866 Phone: NAPERVILLE 1



Through more than sixty years of service it has been our pleasure to serve many of America's leading Estates, Parks, Cemeteries and Municipalities with choice Nursery Stock for their Horticultural plantings and developments.

Write for our General Catalog.

THE AMERICAN SCHOOL AND UNIVERSITY

O. M. SCOTT & SONS CO.

Seedsmen

Marysville, Ohio

LAWN SEED FOR THE CAMPUS AND ATHLETIC FIELD

Scott's Athletic Field Mixture—A combination of fine grasses that will make an extremely wear-resisting turf. Contains three strains of Bent grasses, and other varieties selected for their ability to withstand rough usage. Recommended for seeding or re-seeding football, baseball, soccer and other recreation fields.

Scott's Turf Builder—Is the ideal grass fertilizer. It provides a quick and needed stimulation to grass as well as a long lasting supply of plant food. Turf Builder contains 10 per cent Nitrogen, 6 per cent Phosphoric Acid, 4 per cent Potash—the formula recommended by agricultural authorities as being best for grass.

Scott's Campus Mixture—Composed of grass varieties that will make beautiful, velvety lawns and provide the ideal setting for good-looking school buildings. Three strains of Bent grass are included in the mixture with other permanent turf producing grasses. For use under trees and like places we have a Shady Campus Mixture.

We shall be glad to help with your own grass growing problems. Please feel free to write us about them.

Current prices on the above seed mixtures and fertilizer as well as on other seeds sent upon request.

LAWN CARE, a special seasonal bulletin on grass growing, is sent free for the asking. If you are not already getting this we shall be glad to add your name to our list.

These Schools and Many Others Sow Scott's Seeds Regularly

University of Michigan
Notre Dame University
Cornell University
Amherst College
University of Maine
Ohio State University
University of New Hampshire
University of Illinois
Western Reserve University
Ohio Wesleyan University
Columbia University
Rensselaer Polytechnic
The Tome School
University of Nebraska

THE STEWART IRON WORKS COMPANY

Incorporated

Iron Fence, Chain Link Wire Fence
Baseball and Tennis Backstops

825 Stewart Block, Cincinnati, Ohio

Stewart FENCES

STEWART SCHOOL FENCES

We offer a complete line of Iron and Chainlink Fences and are capable of fulfilling any school fence requirement, whether it be for frontage, rear line, tennis court, or athletic field.

SALES AND ERECTION SERVICE

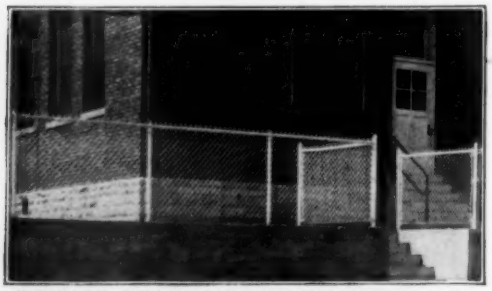
Stewart factory distributors in all principal cities, together with our competent erection crews throughout the country, give our customers a service both convenient and economical. Each installation is under our supervision—consequently the responsibility is undivided.

FACTORY FACILITIES

Stewart has unsurpassed facilities for the manufacture of fencing or any of the products listed below. Factory contains 350,000 sq. ft. of floor space, modern machinery; skilled workmen and draftsmen.

OTHER STEWART PRODUCTS

Bracket Lanterns
Gates (Iron and Wire)
Settees (Iron and Wire)
Railing
Window Guards
Wire Partition Work



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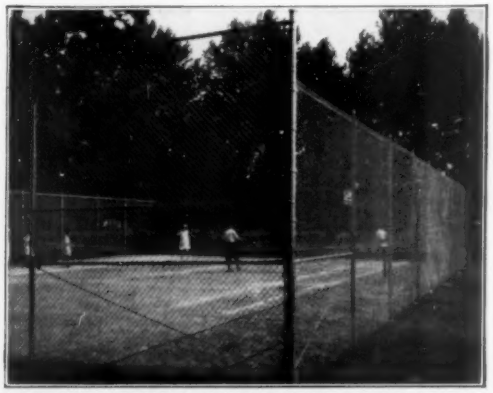

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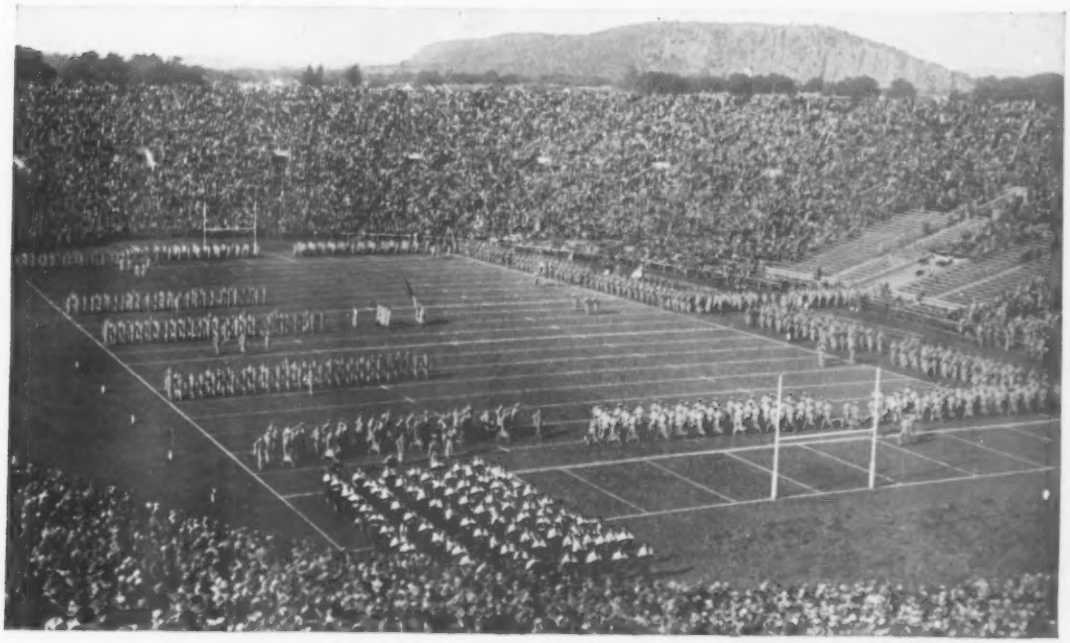

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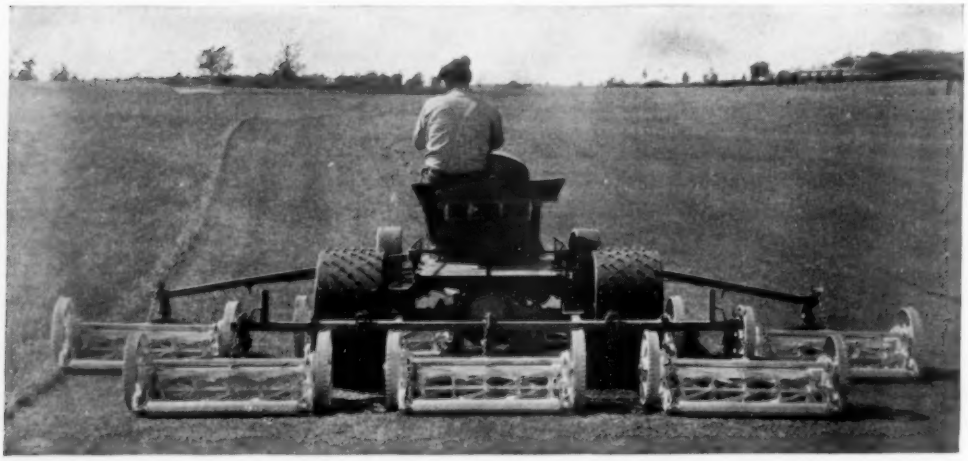

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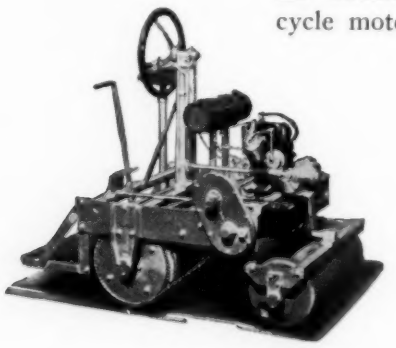

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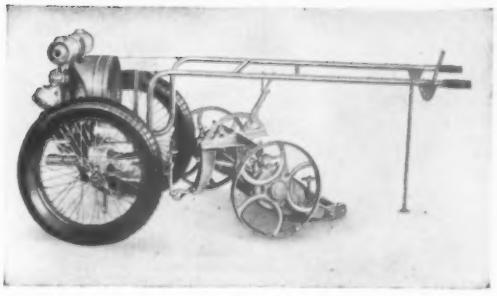

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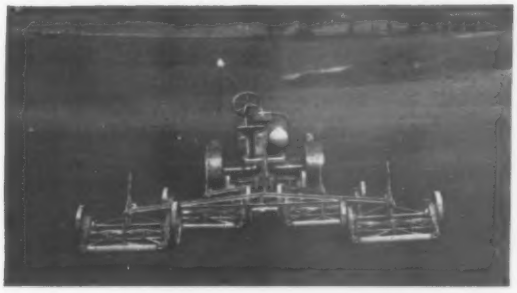

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It is significant that Worthington Gang Mowers are used on more golf courses in the world than all other makes combined.

Section V

BUILDINGS AND EQUIPMENT FOR PHYSICAL EDUCATION AND PLAY

The New Gymnasium at Rutgers University

By PHILIP SAWYER

York and Sawyer, Architects, New York

THE new gymnasium building at Rutgers University, New Brunswick, N. J., occupies the historic site of America's first intercollegiate football game, keenly contested by Princeton and Rutgers in 1869. It replaces the old Robert F. Ballantine Gymnasium, which was razed in a spectacular fire early in 1930. Now for the first time in Rutgers' history the athletic facilities of the college are centralized. While the old Ballantine Gymnasium was more than a quarter-mile from the main athletic field, the new structure is directly opposite Neilson Field on College Avenue. There are now 1300 students in the University.

The architectural style of the gymnasium is Colonial, in harmony with the many old buildings on the campus. Rutgers is one of the nine colonial colleges in the United States, having been founded in 1766 as Queens' College. To retain Colonial characteristics in so large a building, it has been planned to appear as four small units surrounding a quadrangle. The trusses and roof of the building are carried over what might have been the court of the quadrangle, but is really the main gymnasium floor. The entire structure has a frontage of 165 feet and a depth of 191 feet.

Three different roofing materials were used on the different sections of the roof. The sloping portions are covered with Virginia gray slate. The tops of the non-flat portions and the upper flat decks are covered with sixteen-ounce copper, and the flat section in the middle is finished with five-ply slag roofing. Underneath all are three layers, (1) 1-inch pressed spruce fibre board, (2) pre-cast slabs of concrete, and over these (3) a 1½-inch coat of nailing cement, to which the roofing material proper is applied.

The appearance of the building is simple throughout, without being in any sense severe. While economy was a dominating consideration, nothing was spared to make it one of the finest college gymnasiums in the country. The architects aimed to make the larger spaces inside the building as flexible as possible to permit their use for other than the usual athletic and sport

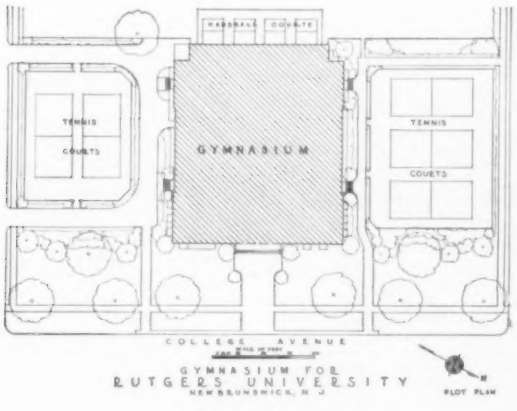
THE NEW RUTGERS GYMNASIUM

activities. For example, space and facilities have been provided for instruction in military science. The large gymnasium has a maple floor and can be used as a vast auditorium for commencement exercises, concerts, banquets, dances and similar events; it may also be used as an exhibition hall for expositions, automobile shows and tournaments. A pantry and portable serving facilities can serve 1,200 guests.

The main gymnasium is an impressively large room, 82 feet wide and 160 feet long, with a balcony containing 1,614 permanent seats. With these and the first-floor bleachers for basketball games, the room can accommodate 2,464 persons. For concerts and similar auditorium use there are available in addition 1,762 folding seats, giving the hall a total capacity of 3,376 seats. In order that the room may be rapidly cleared of the folding chairs, a chute in the floor has been provided through which they may be dropped to a storeroom below.

The exhibition basket-ball court is slightly behind the main gymnasium, so that those in the balcony may see without difficulty. It measures 48 by 84 feet, the size now generally accepted as standard for college games. The three cross courts for practice and intramural games are 41 feet wide and about 70 feet in length.

Swimming is a very popular sport at Rutgers. A large proportion of the students participate. It was found desirable, therefore, to provide two pools, one, 32 by 75 feet, and an instruction pool, 20 by 32 feet. The large pool has a maximum depth of 10 feet and a minimum depth of 8 feet, while the small pool is 3 feet deep. The walls and ceiling are lined with 1½-inch cork insulating board to care for condensation and to absorb sound. The large pool is also equipped with the most modern underwater



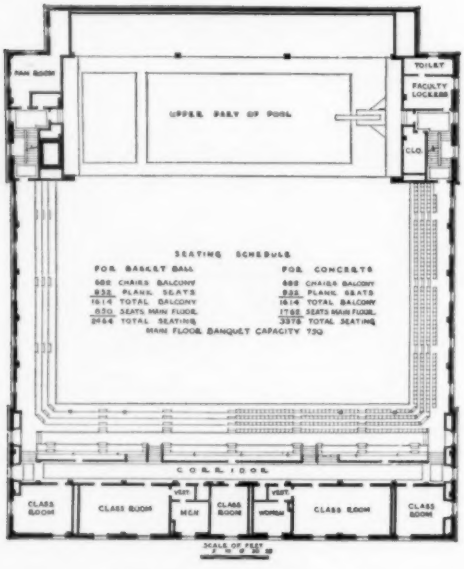
THE PLOT PLAN

A CORNER OF THE TROPHY LOBBY

lighting. A problem which confronted the architects was how to accommodate large audiences at swimming meets. To place 2,000 seats in a separate room solely for pool use would have entailed a great waste of space, since only half a dozen swimming meets are held in any one year; it would also have added considerably to the cost of the building. The problem was solved by the use of a movable partition wall separating the main gymnasium and the pool. The partition may be raised and some 1,500 bleachers may be placed on the main gymnasium floor. These, with the 465 seats in the pool room itself for freshmen meets and general visitors' purposes, give the desired facilities for some 2,000 spectators. This striking solution of an architectural problem in the interest of economy of space and construction costs has aroused the attention of educational authorities.

The building is equipped with a complete ventilation system, with numbers of supply and exhaust fans so arranged that the different portions of the building may be used independently and still receive adequate air changes.

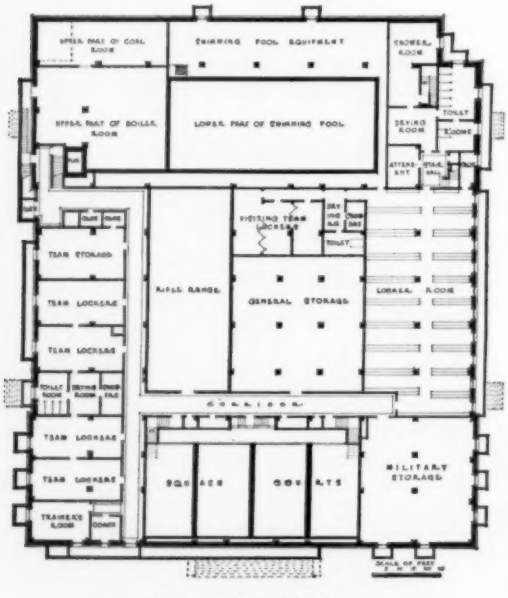
Four squash courts have been placed in the sub-basement. They have maple floors, cement walls and a furred ceiling. Here, too, are a large storage space and most of the mechanical, heating and ventilating equipment. The upper part of the squash courts extend through the basement story. Here are a military storage room for uniforms and equipment, the coaches' room, the trainer's room and five team rooms with showers and drying rooms. At the front of the building, across the corridor from the squash gallery, is the rifle range, 30 by 70 feet; it is lined with 8-inch brick walls. Next to the range is the general storage room, 50 by 50 feet, with a trap-door in the ceiling. It is in this room that the folding seats and bleachers are stored when not in use in the main gymnasium. Adjoining the general storage room are the commodious accommodations for visiting teams. The visitors have their own team rooms, drying rooms and showers.



THE SECOND FLOOR PLAN

The third floor contains the auxiliary gymnasium and the upper part of the main gymnasium

On the first floor are all the administrative offices—athletic staff, physical director, student manager, cashier and graduate manager. There is also a large trophy lobby with built-in trophy cases. Across the lobby are the quarters of the military science and tactics department. These are divided into a large recitation room, private offices of members of the department, and an examination room.

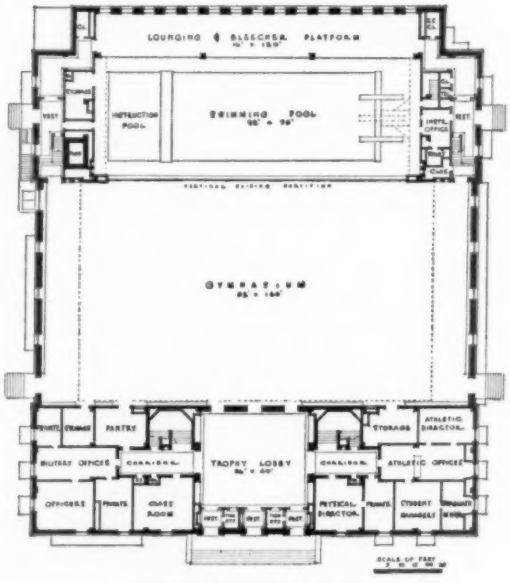


THE BASEMENT PLAN

In the section on the second floor above the main corridor and behind the gymnasium balcony are five classrooms for the use of the military science and physical training departments, and two rest rooms. On the west side of this floor, over the swimming pool, is the auxiliary gymnasium. It is 42 feet wide and 105 feet long, and is to be used for boxing, wrestling, fencing, exercises, practice handball and other indoor sports. There is a large room at each end for gymnasium equipment.

Some of the general features of the building of interest to those planning similar structures are these:

1. Any and all main units of the building may be used at the same time without interference.
2. The seven entrances to the building are arranged for satisfactory control and supervision of the several building units.



THE FIRST FLOOR PLAN

3. To reduce maintenance, the interior gymnasium walls are of face brick.
4. The building is fireproof throughout.
5. The total approximate cost is $700,000.

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

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Essential Physical Education Facilities in Public Schools

By JAY B. NASH

Professor of Education, School of Education, New York University

THE facilities for the modern conception of physical education in the United States represent a large investment. Taking the country as a whole, a conservative estimate of that portion of the public school plant which is devoted to physical education is somewhat in excess of $93,500,000. This seems to be a fairly reasonable estimate inasmuch as the value of the amount used for playgrounds in many of the institutions has not been included.

A school's physical education plant is often inaccurately designated merely as "the gymnasium." And the gymnasium is thought of only in terms of a floor, with no consideration being given to lockers, showers, dressing rooms, swimming pool, administrative offices or outdoor facilities. In the full sense of the term, however, a physical education plant consists of three units:

1. **Instructional unit**—all the spaces in which activity can go on, namely, the gymnasium, swimming pool, special activity rooms, play rooms, standard classrooms, and all the outdoor facilities.

2. **Service unit**—the dressing rooms, showers, lockers, lavatories.

3. **Administrative unit**—the offices for the directors of physical education, doctors, dentists, nurses; rest rooms; store and equipment rooms; janitor rooms; laundry; drying rooms, etc.

It has been found by experiment that it is absolutely necessary to house the administrative unit and the service unit in a fairly adequate structure. The varying climatic conditions make any other procedure impossible. Recent experiments in the South and in California have indicated that for instructional purposes a well-sheltered indoor gymnasium floor is also necessary. This need not be a Class A structure, but protection is needed from sound, wind and cold in practically every community in America.

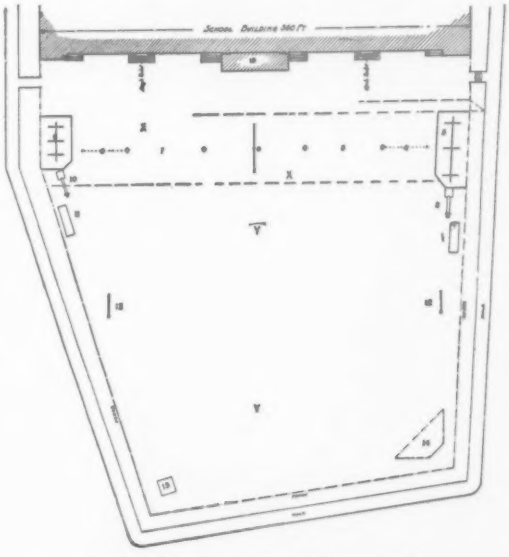
Space Allotments in Various Types of Schools

What percentage of a school building is ordinarily used for physical education? The figure varies according to the level of the school. Checking the estimate of ten or twelve large cities in the country which have had building programs under way, it was found that in elementary schools the proportion of space devoted to physical education ranged from 9.1 to 17, with an average of 13.8 per cent. In junior high schools the range was from 11.1 to 25, with an average of 16 per cent. In senior high schools the range was from 12.9 to 25, with an average of 21.4 per cent.

A number of cities not reported in the above study had percentages as high as 29, and in one or two instances it was over 30. These figures indicate the proportion of square footage being devoted to physical education. They were estimated upon a square footage basis, and the percentage would probably have been higher if taken upon an actual cost basis, since the plumbing and various other facilities connected with physical education are expensive. In this cost certain standards must be maintained.

Factors in the Cost of Instructional Units

Indoor Gymnasiums.—The two-story height and the necessary structural supports make a gymnasium expensive. The cost, however, should be spread over not only to physical education activities but to the social activities of the school, and of night schools, if any, since gymnasiums are used for dances, banquets, plays and pageants as well as for recreation in the evening.



A STANDARD SCHOOL PLAYGROUND

1, Girls' sand box; 2, girls' slide; 3, girls' gymnasium frame; 4, girls' volley-ball court; 5, girls' basketball court; 6, double handball courts; 7, boys' basketball court; 8, boys' volley-ball court; 9, boys' gymnasium frame; 10, high slide for boys; 11, sand box for boys; 12, soccer posts; 13, jumping pit; 14, wire cage backstop; 15, open pergola porch, covered with canvas in summer (for small children's play)

The needs of junior high schools are just as pertinent as those of senior high schools; a play room for the lower grades or even a room combined with the auditorium are required. Schools in Houston, Texas, combine play room, auditorium and cafeteria. The results are very satisfactory. The actual size of the floor should not go below the minimum size of a basketball court, since in high schools as well as in elementary schools, basketball forms the basis of many other games.

Outdoor Facilities.—As in the case of indoor facilities, a certain minimum area is required, regardless of the size of the school. In other words, it takes just as much time for 18 people to play basketball in a school where there are 20 enrolled as it does for 18 to play where they are 500 enrolled. It should also be remembered that a school equipped to take care of a certain number of students, say, 50, is at the same time equipped to take care of 300 or 400 by merely spreading the peak load over six or eight periods.

Table I indicates the minimum for an elementary school where a modern varied program is to be conducted and where the play yard is to be used throughout the year.

TABLE I *

	No. of Places	Use Sq. Footage	Maximum Players
Baseball-soccer-hockey (combined)	1	97,500	18
Basketball	2	12,000	20
Handball	4	4,000	16
Playground ball	1	22,500	20
Quoits	2	4,000	8
Tennis	2	14,400	8
Volley-ball	6	16,000	72
Sand Box	1	160	16
Apparatus	2	16,000	30
Games (Tag and It)	4	3,200	80
	25	189,760 [1]	288 [2]

[1] Area—approximately 4.4 acres.
[2] Players per acre approximately 65.
* From "The Administration of Physical Education," by Jay B. Nash, p. 231. A. S. Barnes & Co., New York. 1931.

Table II indicates the minimum size yard for a high school in which a varied program is to be conducted. It is assumed that this yard will be used throughout the year.

TABLE II *

	No. of Places	Use Sq. Footage	Maximum Players
Baseball	1	97,500	18
Soccer and football	1	75,600	22
Basketball	2	12,000	20
Volley-ball	4	12,000	48
Tennis	4	14,000	16
Handball	4	8,000	16
One-fourth mile track	1	10,700	20
Field events	4	8,000	20
Playground baseball	1	22,500	20
Clock golf	1	1,100	8
Paddle tennis	1	1,800	4
Roque	1	1,800	4
Archery	1	2,500	10
Emergency	1	40,000	20
	..	307,500 [1]	246 [2]

[1] Area approximately 7.1 acres.
[2] Players per acre approximately 34.
* From "The Administration of Physical Education," p. 231.

The Service Unit

The service unit of a physical education plant must provide sufficient space and equipment to enable individuals to store their clothing and get a shower bath in the usual amount of time allotted between classes. The ordinary formula for the number of showers is as follows:

$$\text{Boys} = \frac{\text{Peak-load}—10\%}{3}$$

$$\text{Girls} = \frac{\text{Peak-load}—20\%}{2}$$

The requirement for girls could be considerably reduced if 80 per cent open showers were used, and this seems to be the coming practice. There should of course be toilets, washrooms and locker space in addition.

The Administrative Unit

The administrative unit should consist of a suite of small offices for the purposes of (1) receiving the public; (2) consultation with students; (3) physical examinations; (4) treatments by the doctor and dentist, if such treatments are given; (5) storing supplies. The relationship between these units and the number of square feet of auxiliary rooms, standard classrooms and available classrooms is noted in Table III.

TABLE III *

BOYS' GYMNASIUM AREA ESTIMATE

	Number of Square Feet	Per Cent of Total Area	Auxiliary Rooms	Standard Classroom Units [1]	Available Classrooms
Instructional (indoor)					
Gymnasium floor 60′ x 90′ [2]	5,400			7	1
Bleacher space (if desired) 15′ x 90′.	1,350		1	3½	
Special exercise room 15′ x 30′.	450			½	1
Swimming pool 25′ x 60′.	1,500			2	1
Classroom 25′ x 30′.	750			1	1
Team room 12′ x 20′.	240		1	½	
Miscellaneous.	1,180				
Service				2½	
Basket room 5′ x 60′..	300		1		
Locker room	990		1		
Shower room 9′ x 30′..	270		1		
Lavatory 8′ x 10′..	80				
Laundry 10′ x 12′.	120				
Drying room	175				
Administration				1	
Outer office 8′ x 10′..	80		1		
Inner office (2) 8′ x 10′..	160		1		
Storage of supplies and towels	285				
Instructors' showers and lockers	225				
Total	13,555	8.64%	7	18	4

[1] Standard classroom 25′ x 30′.
[2] Gymnasium must be double height.
* From "The Administration of Physical Education," p. 213.

The above estimate is based upon a school of 600 boys. The estimate for girls is slightly higher, representing a total of 14,654 square feet, a percentage of 9.36 for the entire building of 8 auxiliary rooms, 19½ classrooms and 4 available classrooms.

If a cut has to be made in the above estimate, it is recommended that it be made in connection with the gymnasium floor. The service and the administrative units are the neck of the bottle through which everything must pass, and they are of tremendous importance. Exercise in the open air is more valuable than exercise indoors, so it should not be sacrificed. With several standard classrooms and conference rooms, it should be possible in most states to run an adequate program without any gymnasiums. This would mean that on certain days of the year the program would have to be altered to meet climatic conditions. It is preferable, however, to have a physical education plant with adequate outdoor facilities and adequate office and service units than to have a plant which contains a beautiful gymnasium floor with inadequate office and service units or inadequate outdoor facilities.

Maximum Use Is Necessary

A plant equipped as suggested should be available to the entire community 365 days of the year and as many hours during the day as there is a demand for its use. Even the best school systems in this country are in session for only an average of about half a day in the year. An extensive plant such as has been outlined in this article cannot be justified under this situation. Use must be spread out over a period of time. Schools are faced with the alternative of using their facilities up to capacity every day in the year or of turning them and the task of education over to the local authorities. The latter they are probably unwilling to do, but a choice must be made.

Boys' Gymnasium Locker and Shower Rooms

Summary and Recommendations Based on a Study of Southern California High Schools

By ELMER J. PEERY

Principal, Shafter High School, Shafter, Calif.

A RECENT study of the construction and equipment of the boys' gymnasium, locker and shower rooms in 25 Southern California high schools shows that current practice has kept pace in part only with the development of the physical education program and the tremendous growth in school enrolment which has taken place during the last ten years.[1] The 25 schools studied are typical of Southern California. They are located within a radius of one hundred miles of Los Angeles. In boys' enrolments the schools range from 250 to 1,500. The buildings were all erected in the decade of 1920-1930.

Except in the larger city schools where a retained architect has direction of the school-building program in coordination with the physical education department, due consideration is not usually given to the locker and shower room unit. Yet this unit is the focus of activity for at least half the school population during the day. The present discussion has been limited to the peculiar problems of construction and equipment of, first, the locker room, and second, of the shower room.

Locker Room Construction

Space provisions, orientation, materials, lighting and auxiliary rooms are the principal construction problems facing an educator and architect when the planning of a new locker room is undertaken. The standards set by J. F. Williams in his book, "Organization and Administration of Physical Education," give 15 square feet per pupil unit in the locker room and 19 square feet in the combined locker and shower rooms.[2] The Los Angeles Department of Physical Education recommends a space 65 by 75 feet for a locker, shower and auxiliary room unit to handle 1,000 boys.[3] After deducting a space 15 by 25 feet for a drying room, a space 10 by 20 feet for a lavatory, a space 8 by 12 for a towel room, and space for 1,000 baskets, or approximately 107 square feet, there will be left 3,897 square feet for the locker room. Figured at 10 periods per day, there would be 100 boys a period, and therefore about 38.97 square feet of room per boy in the locker room. Seventeen of the twenty-five schools studied meet the requirements of the former standard, whereas three approach the recommendations of the Los Angeles Department. Obviously, the space required in a straight locker system is somewhat larger than in a locker and basket system. This tends to show that enrolments have exceeded the provisions made in the unit planning.

[1] "A Study of the Construction, Equipment and Utilization of Boys' Gymnasium, Locker and Shower Rooms in Southern California High Schools," by Elmer J. Peery.—M. A. Thesis to University of Southern California, June 1, 1931.

[2] "The Organization and Administration of Physical Education," by J. F. Williams.—The Macmillan Co., 1923.

[3] "Recommendations and Suggestions in the Building of Gymnasia in the Los Angeles School District."—Department of Physical Education Bulletin, Los Angeles School System, 1930.

Among the findings concerning location, materials and color are the following: nineteen of the twenty-five locker and shower units were placed at grade level, three were above and three were below; fifteen have brick exterior walls; and twenty-three have cement floors. Table I shows in detail the provisions studied.

TABLE I

MATERIALS USED FOR LOCKER ROOM WALLS, CEILING, AND FLOORS IN 25 SOUTHERN CALIFORNIA HIGH SCHOOLS

Item	Number
Exterior Walls	
Brick	15
Concrete	3
Wood	2
Stucco	5
	25
Interior Walls and Ceiling	
Brick	5
Concrete	2
Wood	2
Cement plaster	15
Plaster	1
	25
Wall Colors	
White	7
White and tan	1
Tan	2
White and gray	2
Gray	2
Red brick	2
Cream	8
Natural concrete	1
	25
Ceiling Colors	
White	15
Gray	2
Cream	5
Brown	2
Natural concrete	1
	25
Quality of Paint Used	
Waterproof	6
Regular	19
	25
Floors	
Cement	23
Cement and wood	1
Wood	1
	25

Lighting provisions were generally inadequate throughout the schools studied. According to G. D. Strayer and N. L. Engelhardt's "Standards for High School Buildings," the glass area should be one-fifth to one-fourth of the floor area, the amount to be determined by the latitude and by the presence or absence of light obstructions.[4] Problably 10 to 15 per cent of the floor space would be desirable in the locker room under a gymnasium, although classroom brightness is preferable. The majority of the locker rooms studied need more natural light. The range is from 1 per cent to 124 per cent of the floor area. Five schools supplement the side light from windows by skylights. All except one of the schools studied have electric light installations.

Ideal heating and ventilation arrangements are found when steam pipes are located in a raised permanent platform under the lockers, thereby making it possible both to dry athletic clothes and to warm the room. It was found, however, that eight of the twenty-five locker rooms have no heating provision, two use hot air systems, six use steam radiators, one uses a hot water system, and eight use gas radiators. Most of the radiators were located under windows.

Four of the twenty-five schools have permanent storage-basket room provisions. Two have temporary storage-basket arrangements. Opinion among directors as to the relative value of the basket system compared to individual lockers is more or less even. Each system has its administrative problems. The storage-basket system has been adopted as a space-saving device. Sixteen of the schools have tile floors in the lavatory.

Locker Room Equipment

The types of lockers in use in the schools studied are as follows: ten use individual lockers, two use the tote-box system, and thirteen use the self-service tote-box system. Eleven schools use stationary benches and seven use movable benches. Towels are principally owned by the schools and washed by laundries on contract. It was found that three have school laundries, twenty-one patronize local laundries on contract, and one employs an individual to wash the towels on contract.

Shower Room Construction

Shower room space is provided in two forms. One, the long, narrow arrangement, has showers on one wall; the other, the square or rectangular-shaped room, has showers around the walls, overhead, or both. Table II shows that in five schools

TABLE II

MATERIALS USED FOR SHOWER ROOM WALLS, CEILINGS AND FLOORS IN 25 SOUTHERN CALIFORNIA HICH SCHOOLS

Item	Number
Exterior Walls	
Brick	7
3 sides brick, 1 concrete	1
Brick bearing wall with hollow-tile partitions and steel-lath ceiling	2
Concrete	2
1 side concrete, 3 stucco with steel lath	1
Concrete up 4 ft., remainder steel lath	1
Concrete with tile partitions	1
Concrete, tile and steel lath in stucco upper walls and ceiling	1
Hollow tile and steel lath	2
Stucco with steel lath	7
	25
Interior Walls and Ceiling	
Brick	2
Cement plaster	13
Cement plaster with glazed tile up 6-8 ft.	5
Cement plaster with glass tile up 4 ft.	1
Cement plaster with galvanized iron to steel	2
Cement plaster with 1 wall with marble to 4½ ft.	1
Smooth-finished concrete	1
	25
Floors	
Tile	5
Concrete	20
	25

[4] "Standards for High School Buildings," by G. D. Strayer and N. L. Engelhardt.—Bureau of Publications, Teachers College, Columbia University, 1924.

interior-finish cement plaster walls are used with glazed tile extending up 6 to 8 feet. In five cases the floors were tile, and in twenty they were concrete. Twenty-four schools have artificial light in the shower rooms. Six have skylights, and two of the six have skylights in addition to regular windows. The number of windows ranges from one to thirty; the latter were placed in two banks on the south side of a bleacher section which housed the locker and shower room. There was no apparent uniformity in the size or placement of windows, although for economy of construction and repair this seems desirable. Frosted glass was most generally used.

As stated above, artificial light was provided in all but one of the schools studied. The number of electrical outlets ranged from two to eight. In twelve cases the globes were enclosed in glass containers, in five they were protected by wire, and in seven they were exposed or unprotected.

Control valves present an unsolved problem. Opinion in Southern California favors the individual shower control. Twenty-three schools were found to use individual controls, and two use gang control. Hot water was provided in ten schools from a central heating plant, while fifteen have special heating systems. The provisions for the control of the exact amount of heat in the hot water which is sent to the shower head are various. The central boilers all have thermostats which provide water at the desired degree of heat. Two schools use mixing valves, operated from the custodian's room. In the case of the central boiler system, the first boy under may get a dose of steam and hot water unless he is careful. This rarely happens, but one school reported a student severely scalded and burned because the thermostat failed to work on the first water through the pipe.

The best arrangement for soap distribution was found in three schools which have liquid soap distribution provisions. Other schools do not supply soap, because of its cost, or, more important, because of the danger of slipping due to soap bars on cement floors. Furthermore, soap bars offer material for soap fights, which make an administrative problem which directors wish to avoid. Yet soap is a desirable adjunct to bathing. If bars of soap are to be used, soap boxes or containers should be inset in tile walls high enough to be washed by the shower head. Liquid soap, as used in three schools studied, is delivered to the student through a pipe from a large barrel either under air pressure or by gravity. One school reported that originally the pipe for the soap supply line was iron and that this lasted two years before rusting out, whereas their most recent pipe was brass and had lasted two years without evidence of rust or breaking.

Recommendations

The following summary presents recommendations based on the best provisions found in the twenty-five boys' locker and shower rooms studied.

Construction

Space Provisions.—About 40 square feet of space per boy per period should be provided in the locker room. Four square feet per boy is adequate for the shower room.

Location of the Shower Room.—The best location is on the side of the building which receives the most sun.

Location of Locker Room.—Lockers should be placed opposite the showers in such a manner as to give plenty of light in both the locker and shower rooms. If in double tiers, the lockers are best located against the wall; if in single tiers, then back-to-back in rows perpendicular to the windows.

Wall Materials.—Concrete or brick make the best external wall. Furrowed hollow tile or enameled brick should be added to the shower room wall to enclose the pipes and provide a surface for small octagon ¾-inch tile or "S" Series finish. Plaster facing in the locker room will stand rough treatment if placed on solid wall.

Ceiling Materials.—Waterproof cement plaster painted a light color is desirable because of its light-reflecting and moisture-resisting qualities.

Floor Construction and Material.—Efficient maintenance will never be possible unless the floor is constructed with an adequate incline and sufficient drainage outlets, and of such materials as will permit proper cleaning. Cement material is preferable in the locker room. Small ¾-inch octagon or "S" Series tile facing in the shower room is recommended.

Lighting Provisions.—The glass area should be one-sixth to one-fourth of the floor area. The windows should be designed to keep out sun glare and to prevent outsiders' looking in or gaining illegal entrance. Electric light globes should have full glass protection; this eliminates rusting and corrosion of the sockets and connections, and protects the globes from playful hands.

Heating and Ventilation.—Radiators or pipes should be placed under the lockers. Otherwise, personal equipment must be dried outside in a special drying room, or, as usually happens, remain damp. The locker room should be cooler than the shower room while in use. The shower room must have special ventilation to carry off the steam.

Plumbing.—Proper and adequate plumbing is very important. Supply pipes must be large enough to supply hot water at such a continuous flow that it will not be necessary to readjust all showers when a new shower is turned on. Extra-large drain pipes are desirable, to avoid overflow. The hot water supply must have a thermostatic control.

Lavatory Rooms.—The lavatory is the center of traffic. Metal stalls with a baked enamel finish are preferable to marble stalls. No doors should

be included. Urinals on the floor should be of regulation heavy enamelware. There should be accessible cleaning traps for every drain. A tile floor, with the tile extending up one-third of the side wall, is most desirable. The ceiling should be painted a light color.

Towel Room.—The towel room should be placed near the shower exit, so that it can be used as a supervision post with the custodian, instructor or monitor in charge. It should be so constructed that it will be impossible to enter it without the proper key. Towels cost money.

Drying Room or Space.—The drying space adjoining the shower space should be well drained and of non-slip tile or rough cement. An area 10 by 20 feet is recommended for 100 boys per period. If the space is separated from the shower room by a sill, then an extra drain is necessary. Special ventilation is desirable.

Janitor's Room.—Unless a central janitor's shop is close at hand, the janitor's room should be large enough to hold the equipment for the locker and shower room unit.

Visiting-Team Room.—There should be a visiting-team room which can be locked up and which has a separate entrance. In small schools both teams may use the same showers if the room is adjacent to the showers.

Officials' Room.—An officials' shower and dressing room is necessary unless one is furnished in the administrative suite of the gymnasium.

Equipment

Lockers.—Strong individual lockers or the tote-box system of baskets may be used. The self-service tote-box system is recommended as a space-saving device. Combination padlocks are the most desirable, especially those of recent development.

Towels.—The school should buy its own towels permanently marked with the name of the school.

Benches.—The stationary type on permanent stands of pipe bolted to the cement are recommended. Heavy plank and standards are essential.

Shower heads—A non-adjustable type should be used, placed 6½ to 9 feet from the floor. Pipes should protrude from the wall, and should be of ample size.

Control Valves.—An individual control system is recommended.

Soap Supply.—Liquid soap dispensed to each student through brass pipe from an overhead barrel or under air pressure is preferable. Some sort of soap supply should be provided to encourage proper bathing habits.

Foot Bath.—Foot baths must be provided at the shower room entrance to combat "gym itch" or "athlete's foot," unless a special floor procedure is used or unless local disinfecting conditions do not promote growth of the fungus.

American secondary education is still in the experimental stage of development as we attempt to make it meet the needs of our changing society. But there is no need of repeating the errors of a previous decade. Poor construction and equipment result in rapid depreciation. Poor orientation promotes inefficiency. Educators owe it to their schools and their constituents to plan and equip all units of a school building with the utmost of care.

BUILDINGS AND EQUIPMENT FOR PHYSICAL EDUCATION AND PLAY

The following articles on these subjects appeared in the 1931-1932 edition of The American School and University:

Some Essentials in Playground Planning
By Ernst Hermann, Playground Planner and Superintendent of Playgrounds, Newton, Mass.

Desirable Features in New Swimming Pools

A New School Athletic and Students' Activity Building (Williston Academy)
By James H. MacNaughton, Architect

Equipment for Physical Education in City Public Schools
By Marie M. Ready, Associate Specialist in Physical Education, U. S. Office of Education

The Accommodations and the Financial Operation of the Buffalo All-High School Stadium
By Carl H. Burkhardt, Supervisor of Physical Education, Buffalo, N. Y.

The Seabury Gymnasium for Men, Berea College

BY GEORGE HERBERT GRAY

ARCHITECT, NEW HAVEN, CONN.

THE Seabury Gymnasium for Men at Berea College, Berea, Ky., is thoroughly modern in conception, equipment and material. It is nevertheless in perfect harmony with the Georgian style adopted for all buildings on the campus. Designed to accommodate 1,600 men students, it is of semi-fireproof construction. The exterior walls are of local sand-mold brick laid in Flemish bond, with Indiana sandstone trim. Steel sash have been used, and the roof is of Vermont green slate.

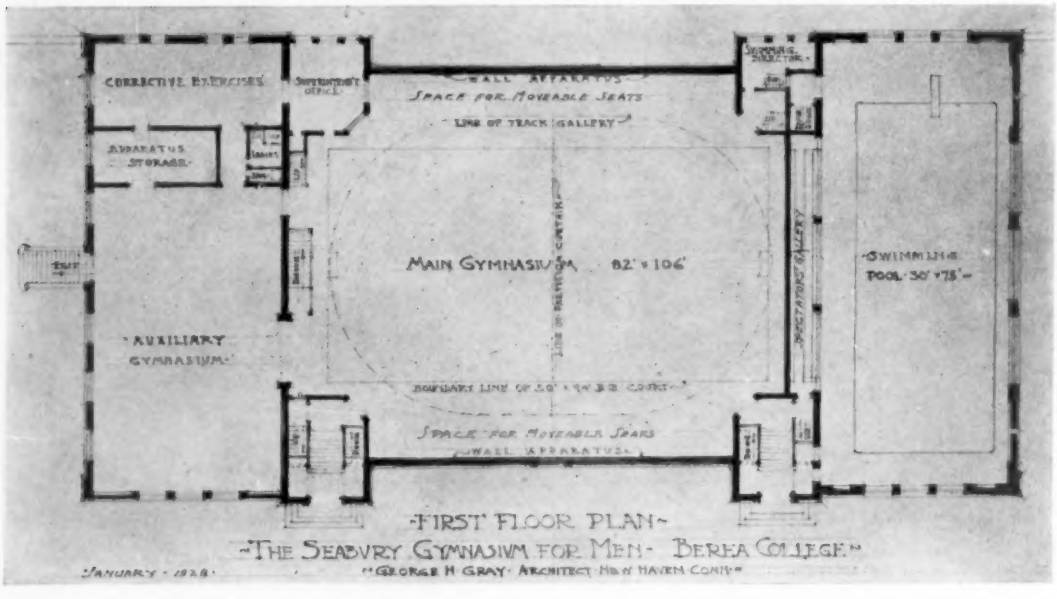
The building faces on the long axis of the west campus. The main floor of the main gymnasium is about seven feet above the grade level in front, thus allowing room for generous windows on this side in the basement. On the opposite side, the grade is six feet lower, so that the basement floor, on the grade level, is virtually the first floor. The athletic field is a few hundred feet down the hill.

The Main Gymnasium

As is evident from the photograph of the exterior of the building, the main gymnasium extends to the roof. Light open French-type trusses were used. The two-inch roof planks are covered with insulating board on the outside, and inside are exposed to view. Around the wall is a wainscot six feet high of buff-finished glazed structural tile, above which the brick walls are exposed and finished in brick of a lighter shade of buff. Tile is also used extensively in the basement and natatorium.

Climatic conditions at Berea make outdoor track work unpractical during many months of the year, and this fact coupled with the college's policy of "physical-development-for-all" led to the decision to install a running track in a gallery above the main gymnasium floor. When the track is not being used for running, it can be used for spectators. It can be reached both from the gymnasium floor and from the two stair towers. Under it is the fixed wall apparatus and free floor space for 612 movable bench seats, and on the track level is space for 730 seats. Trap-doors open from the track level into a storage space between the track floor and the ceiling below, in which spectators' benches are stored. A canvas partition can be dropped from the roof trusses across the center of the main gymnasium floor, making it possible for two classes to use the room at the same time.

The construction of the gymnasium floor is an innovation. To obtain uniform resiliency throughout, mill construction was used, i.e., heavy slow-burning timber construction supported on steel

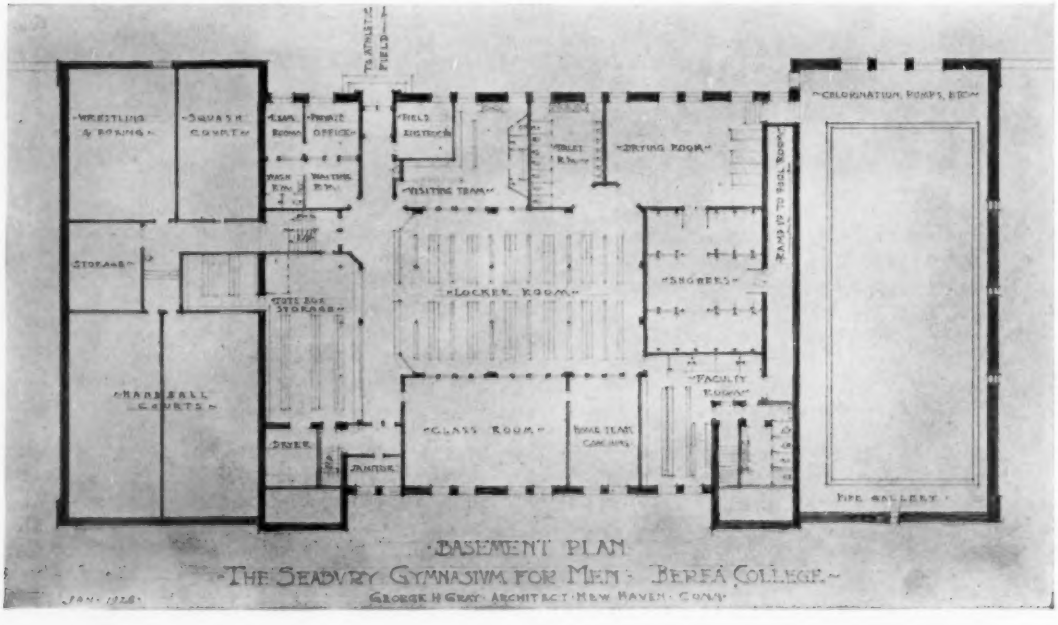


girders and cast-iron columns. It is eminently effective and more economical than rigid fireproof construction.

The Natatorium

The auxiliary gymnasium and the corrective exercise room adjoin the main gymnasium in the west wing. The natatorium occupies the entire east wing of the building and has a flood of direct sunlight on the south and west sides, as well as large windows on the east. The advantage of direct sunlight is often ignored in planning pools. The swimming director's room and the entrance to the spectators' gallery are on the main floor of the building, while the natatorium proper is half-way between the main floor and the level of the campus, so that it was possible to place the foundations of the pool economically at grade level.

The pool is 30 by 75 feet and is finished in ceramic tile, rough on the walking surfaces and smooth in the tank, with standard markings for lanes, distances, depths, etc. The walls and ceilings are of waterproof stucco painted a sea-green. Heat



is supplied by semi-direct radiation from under the windows.

The floor and walls of the pool are of reinforced concrete, containing an integral waterproofing, poured as a continuous operation after the walls and the roof were closed in. As soon as the forms were removed, the pool was filled to test the waterproofing. The inner walls were then treated with a bitulithic coating and a cement waterproof coat to receive the tile.

The roof is constructed of four plate girders segmented in profile, which support steel purlins and ribs. For sound and heat insulation, the body of the roof is finished on the under side with waterproofing cement stucco and on the upper side with insulating board to receive asphaltic roofing.

The Basement

The faculty locker room in the basement is so arranged as to make it possible for a limited number of women to use the pool occasionally, without interruption to the general use of the gymnasium. Also in the basement are the students' tote-box, locker, shower, toilet and drying rooms, as well as rooms for the home team and a visiting team. There is also a classroom for team instruction, a suite for physical examinations, and the office of the field director. In the west wing, at a slightly lower lever, are handball and squash courts and a room for wrestling and boxing. Each of these latter rooms has a gallery for spectators.

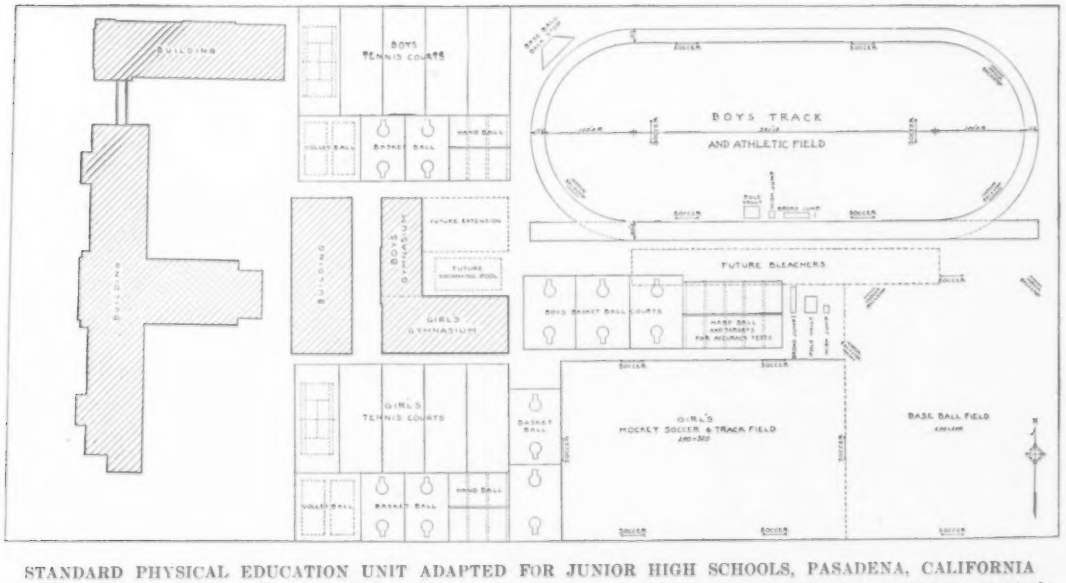
The building is heated by vacuum vapor supplied from the college power house, for the most part through indirect wall radiation from concealed panels of flues under the windows. The pool water is purified by chlorination. The lighting fixtures in the main gymnasium are of special design to eliminate glare, and in the natatorium to eliminate condensation. Vacuum cleaning outlets are distributed throughout the building. The gymnasium was built by the construction organization of the college, using a large amount of student labor. The commercial cost of the building would have been about $200,000.

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

Caulking—Pecora Paint Co.
Ceramic Tile—Standard Tile Co.
Glazed Wall Tile—Arketex Corp.
Gymnasium Apparatus—Fred Medart Mfg. Co.
Inside Brick—The Canton Brick & Fireproofing Co.
Inside Insulating Board—The Celotex Co.
Insulating Plaster—American Gypsum Co.
Lighting Fixtures—Curtis Lighting, Inc.
Outside Brick—Barbourville Brick Co.
Steel Sash—Allison Steel Products Co.
Waterproofing of Pool—The Philip Carey Co.

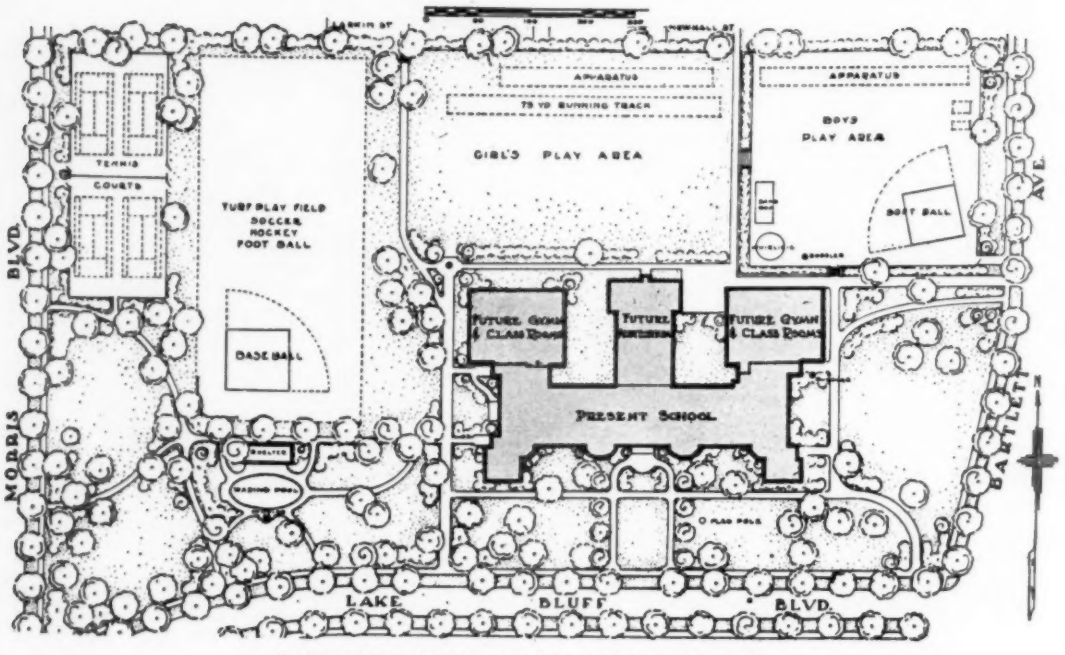
Playground Plot Plans—Good and Not So Good

Comments by George D. Butler, National Recreation Association



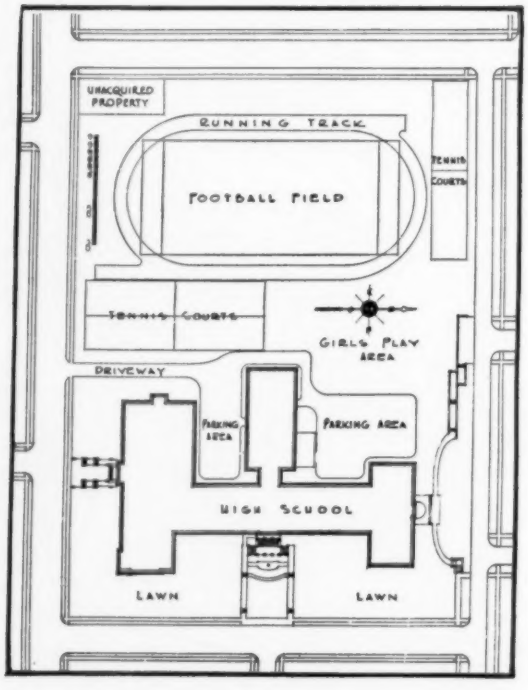
STANDARD PHYSICAL EDUCATION UNIT ADAPTED FOR JUNIOR HIGH SCHOOLS, PASADENA, CALIFORNIA

This plan is outstanding for the unusual number and variety of facilities for games and sports, utilizing effectively the entire area available for play purposes. Many other fields of 10½ acres do not accommodate half as many pupils. Approximately 500 boys and girls can take part in activities on this field at one time. Few junior high school sites have as many game courts as are provided in this plan, among them: tennis, 10; volley ball, 4; basketball, 9; handball, 22; soccer, 5; running track; spaces for field events and other facilities.



LAKE BLUFF GRADE SCHOOL, SHOREWOOD, WIS.

This property of more than ten acres affords a site for the grade school building, neighborhood park and children's playground. The play area is effectively arranged to provide for a variety of interests and activities. A special feature is the wading pool which, it is assumed from its location, is intended primarily for the use of very small children. An area of this type should be an asset to any neighborhood.



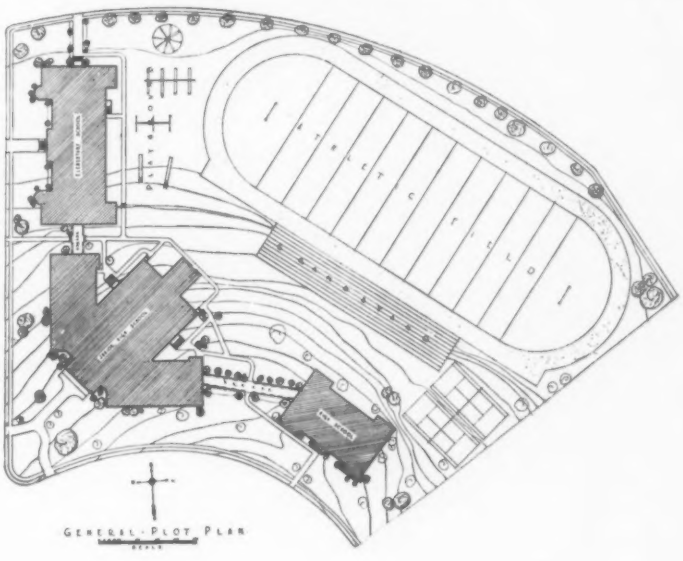
A HIGH SCHOOL IN WISCONSIN

This high school site of 9.6 acres is obviously inadequate for the needs of a modern high school. There is only one major sports area and even this is not well suited for baseball. By omitting the tennis courts at the north end of the field and shifting the track to the north end, volleyball, basketball and other courts to serve a considerable number of pupils could be provided at the south end.

The girls' field is much too small for the highly organized games and sports played by high school girls. Situated between the parking area and the running track, it has no degree of isolation such as is desirable. This plan illustrates the all too common practice of allotting the major portion of high school play fields to boys and failing to provide for the needs of the girls.

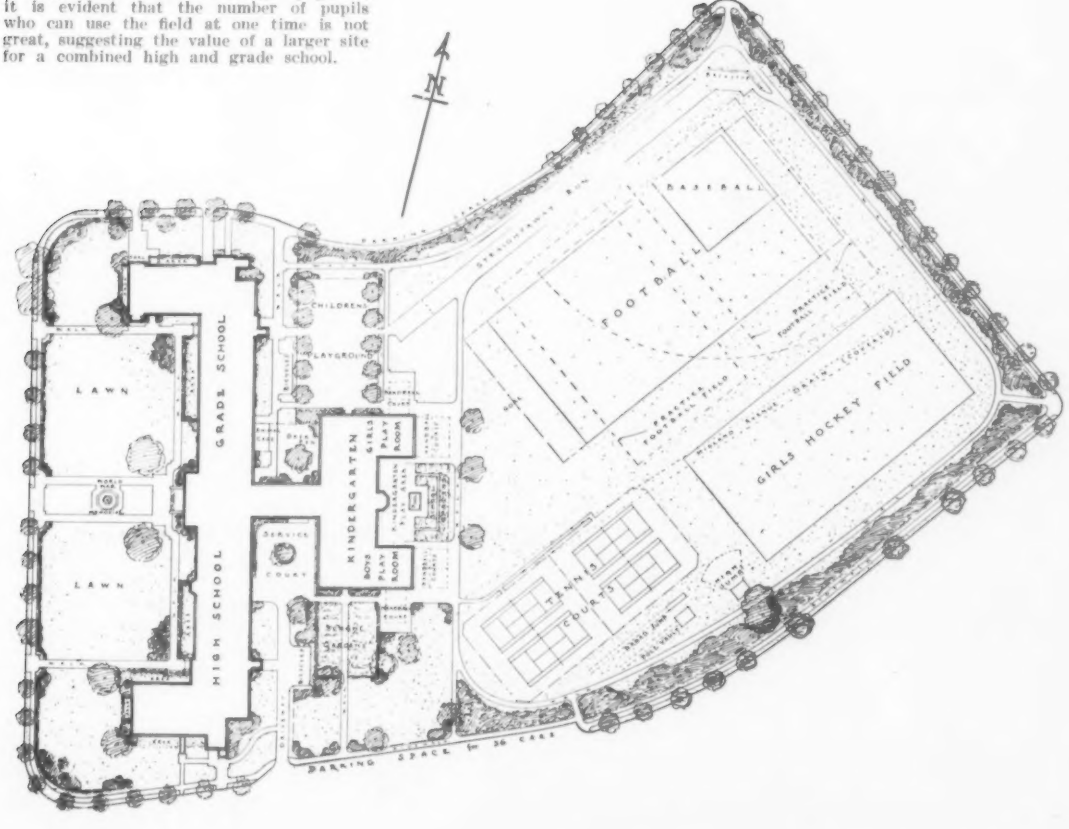
A TEXAS SCHOOL GROUP

The play space and facilities provided for this splendid group of school buildings are so limited as to barely meet the needs of any one of the individual units. Only a small number of pupils can be served at one time, and the scarcity of game courts and other play facilities is obvious. For example, only one major activity area is available for the use of the boys and girls in both the junior and senior high schools, whereas an absolute minimum of four such fields should be provided.



BRONXVILLE SCHOOL, BRONXVILLE, N. Y.

This 12-acre plan shows a very ingenious and effective use of the open space available for play purposes. Of special interest are the zoo, the gardens and the kindergarten playground. The orientation and location of the facilities and the game courts are excellent. Yet even though the unassigned space be used for group games, it is evident that the number of pupils who can use the field at one time is not great, suggesting the value of a larger site for a combined high and grade school.



THE MATHIESON ALKALI WORKS (INC.)

250 Park Avenue, New York, N. Y.

PLANTS

Niagara Falls, N. Y., and Saltville, Va.

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PRODUCTS

HTH
HTH-15
Liquid Chlorine
Anhydrous Ammonia
Aqua Ammonia 26°
PH-Plus

HTH

For a wide variety of sanitary purposes, particularly around the swimming pool and gymnasium, HTH is the most reliable and convenient source of available chlorine. It is more than twice as concentrated as ordinary chlorinated lime and retains its strength even at summer temperatures. Unlike chlorinated lime, HTH remains a dry, free-flowing powder, and is readily soluble in cold water.

HTH comes in 4-lb. cans, each contaning 2½ lb. of active chlorine available for germicidal action. It is most conveniently purchased in case units of 12 cans each.

FOR SWIMMING POOL SANITATION

At thousands of swimming pools throughout the country, HTH is used in and around the pool. For water purification, it can be added direct to the pool in powder form, or fed in solution form as calcium or sodium hypochlorite. By dissolving the entire can in 30 gallons of water, a stock solution with 1% available chlorine (10,000 p.p.m.) is prepared. One-half gallon of this solution for each 5,000 gallons of water will give a chlorine dosage of 1 part per million.

Chloramine treatment of pool water, obtained by using HTH solution in connection with Mathieson Ammonia, is one of the most dependable and satisfactory methods available, as high chlorine residuals can be maintained with a minimum of taste and irritation to eyes and membranes.

A PREVENTIVE FOR "ATHLETE'S FOOT"

Gymnasium locker rooms, toilets, pool runways and diving boards are undoubtedly among the worst offenders in the spread of "athlete's foot" and other ring-worm skin infections. Use of HTH will prevent damp floors from becoming transfer points for these organisms from one person to another.

THE THOMPSON SWIMMING POOL AT PHILLIPS EXETER ACADEMY, EXETER, N. H., LIKE MANY OTHER SCHOOL AND UNIVERSITY POOLS, IS KEPT SAFE WITH HTH

Sprinkle dry HTH daily on the floors of shower rooms and walk ways, where it will be tracked about on the feet of bathers. Spray or swab all floors, benches, stools, diving boards, mats, steps, etc., with a solution made by dissolving 1 oz. HTH in a gallon of water (5,000 p.p.m.). Foot baths containing this concentration of HTH solution also are valuable preventives for such infections.

HTH is also being used on cinder tracks and jumping pits to minimize the danger of infection following falls.

EMERGENCY USE

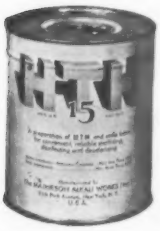
A supply of HTH is kept on hand by many water-supply and swimming pool operators who use liquid chlorine for regular treatment. If trouble occurs with chlorinating equipment, HTH guarantees safety in the emergency.

For temporary camps, on hiking trips, and at other times when the water supply and sanitary facilities are doubtful or unsatisfactory, use of HTH removes the danger of infection. When algae growths collect in pools or storage reservoirs, or clog filters, periodic dosage with HTH will destroy them.

STERILIZING AND BLEACHING

School laundries, following the practice of commercial laundries throughout the country, find that HTH solutions are uniform and economical for bleaching and sterilizing of towels, gymnasium uniforms and sweat shirts and as a sterilizing rinse for bathing suits.

HTH-15



Mathieson's new chlorine germicide, HTH-15, yields non-corrosive sodium hypochlorite solutions when added direct to water. It is a most convenient form of chlorine for sterilizing metal equipment in dining hall and dormitory, and for general sanitation around shower rooms, toilets, urinals, etc.

LIQUID CHLORINE

Mathieson Chlorine for sanitary service is supplied in special aluminum-painted cylinders in two sizes—105 pounds net and 150 pounds net—and has long been considered the standard for use in safeguarding municipal water supplies. It is used in the sterilization of many well-known swimming pools throughout the country.

MATHIESON AMMONIA

Pools using the ammonia-chlorine process find it a great convenience to purchase from Mathieson and get both materials from the same reliable source of supply, with warehouse stocks available throughout the country. For the largest pools it is Mathieson Liquid Chlorine and Anhydrous Ammonia; for any but the largest it may be Mathieson HTH and Aqua Ammonia. Mathieson Anhydrous Ammonia is supplied in 50, 100 and 150-pound cylinders; Aqua Ammonia, 26°, in 110-gallon drums.

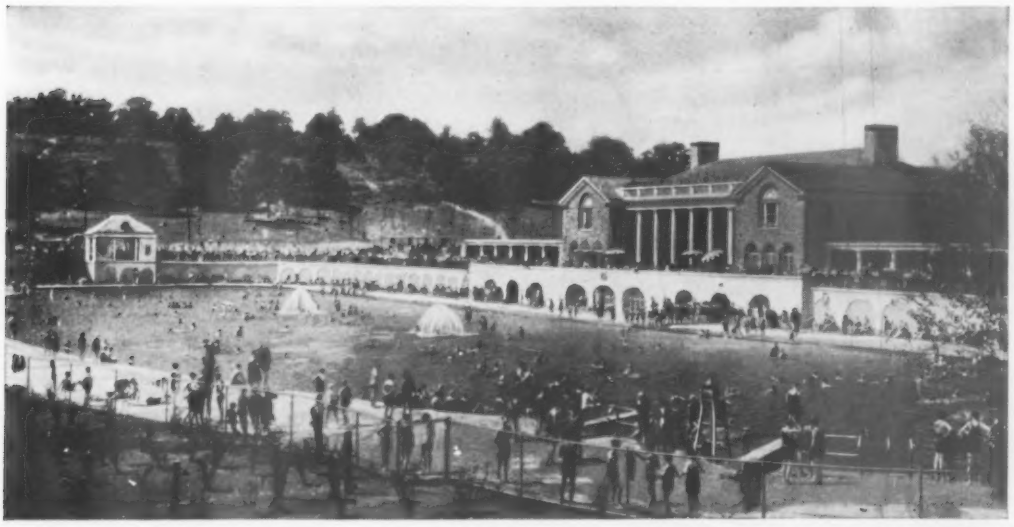
PH-PLUS

Most complaints about irritating swimming pool water, though often ascribed to the chlorine dosage, result from pool water of improper alkalinity (or pH). Water purifying processes, particularly when alum is used, cause a decrease in alkalinity that robs the water of its natural qualities, making it harsh and irritating. Filtration becomes less efficient. Chlorine, though its presence is more noticeable, loses its sterilizing power faster in this unnaturally acid water.

The convenient bricks of PH-Plus, simply suspended in the pool in a cotton bag, slowly dissolve and bring the water back to within the proper pH range. PH-Plus comes in 100-lb. kegs and 350-lb. barrels.

A BOOKLET YOU WILL FIND USEFUL

A sanitary swimming pool and sanitary pool surroundings depend most of all upon a definite routine to be followed day after day, from entrance door to exit. Our 24-page illustrated booklet "Keeping the Pool Safe and Sanitary" outlines such a routine with specific recommendations that mean economy as well as safety. Write for a copy today and ask also about HTH-15, the new form of HTH for general sanitation.



AT TIBBETTS BROOK SWIMMING POOL, YONKERS, N. Y., AND OTHER POOLS SUPERVISED BY WESTCHESTER COUNTY PARK COMMISSION, HTH IS USED IN SPECIAL SANITARY WORK AND AS A RESERVE CHLORINE SUPPLY

THE NURRE COMPANIES, INC.

BASKETBALL BACKSTOP DIVISION

Factories:
St. Louis, Mo.
Kansas City, Mo.

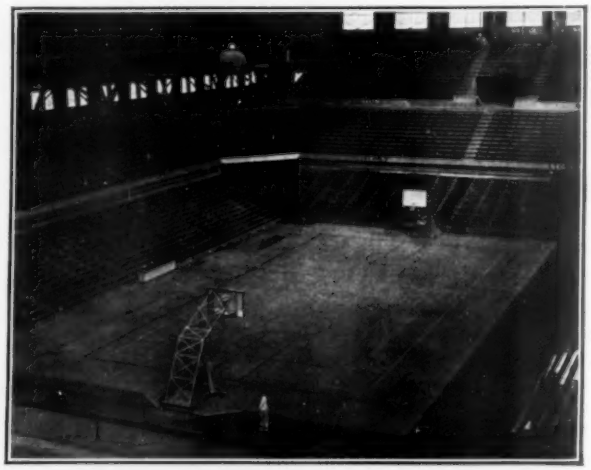
General Offices
Bloomington, Indiana

Factories:
Memphis, Tenn.
Burlington, Iowa

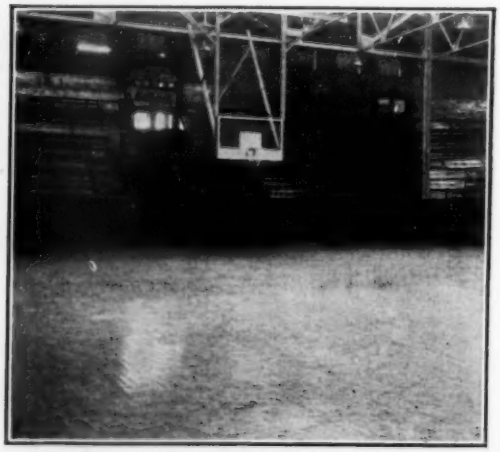
GLASS FOR EVERY PURPOSE

MODERNIZING THE GYMNASIUM

Nurre Plate Glass Basketball Banks are fast becoming standard equipment in the better gyms of the school world. And there is a reason. Nurre Backstops offer a method of absolute standardization of playing conditions for the visiting as well as the home team. The smooth glazed surface of plate glass eliminates all possibility of loss of shot or game due to a warped surface or deadened rebounds. After the first game played with Nurre Backstops, players swear by them, coaches endorse them, and athletic directors advocate their use. Nurre Plate Glass Banks are just as serviceable when painted as when used transparent. Nurre Basketball Backstops are used by hundreds of schools, colleges and professional basketball teams to insure absolute uniformity in playing conditions resulting in a definite lack of handicaps for either team.



SHOWING FIELD HOUSE TYPE INSTALLATION OF NURRE PLATE GLASS BANKS FOR BUTLER UNIVERSITY, INDIANAPOLIS. STATE BASKETBALL TOURNAMENTS ARE HELD HERE



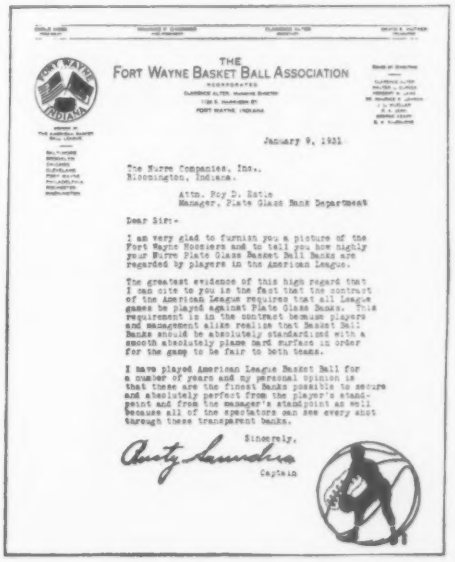
AN INSTALLATION OF A TRANSPARENT NURRE GLASS BANK IN THE SOUTH SIDE HIGH SCHOOL GYM, FT. WAYNE, INDIANA

IDEAL GYMNASIUM EQUIPMENT

Nurre Standardized Plate Glass Basketball Banks are ideal for gymnasium equipment. They are fast replacing all other backstops for many reasons. Plate Glass is transparent, which increases seating capacity where space behind the banks must be utilized. They are more durable because they do not warp, chip, splinter, crack, wear away nor rattle, but always present an absolutely smooth plain surface for every shot. Whether it be a field shot or a safety, the player knows in advance that if the ball is placed right, the rebound can mean but one thing—a basket.

LIFE-LONG EQUIPMENT

Nurre Basketball Banks are made of thick Genuine Plate Glass. The surface of every plate is polished to a smoothness obtainable only in glass. They do not wear away, so can be depended upon to give efficient service for years to come.



THE
FORT WAYNE BASKET BALL ASSOCIATION

January 9, 1931

The Nurre Companies, Inc.,
Bloomington, Indiana.

Attn. Roy D. Estle
Manager, Plate Glass Bank Department

Dear Sirs:-

I am very glad to furnish you a picture of the Fort Wayne Hoosiers and to tell you how highly your Nurre Plate Glass Basket Ball Banks are regarded by players in the American League.

The greatest evidence of this high regard that I can cite to you is the fact that the contract of the American League requires that all League games be played against Plate Glass Banks. This requirement is in the contract because players and management alike realize that Basket Ball Banks should be absolutely standardized with a smooth absolutely plane hard surface in order for the game to be fair to both teams.

I have played American League Basket Ball for a number of years and my personal opinion is that these are the finest Banks possible to secure and absolutely perfect from the player's standpoint and from the manager's standpoint as well because all of the spectators can see every shot through these transparent banks.

Sincerely,

Captain

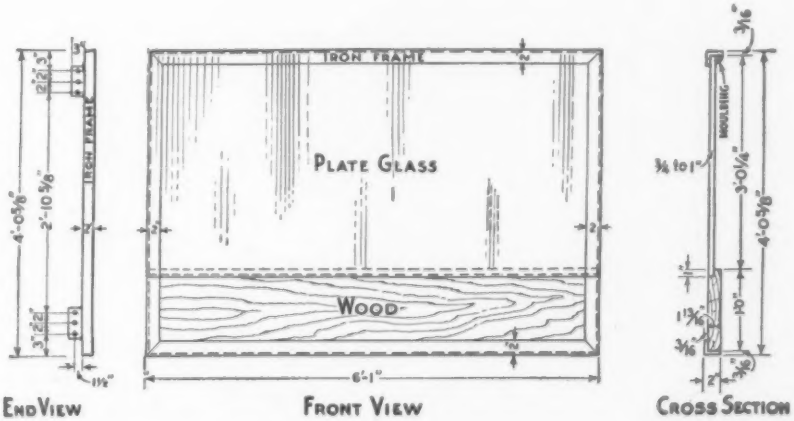
HERE'S WHAT THE PLAYERS IN ONE ASSOCIATION THINK OF NURRE BANKS

ANY TYPE SUSPENSION

The type of suspension best fitting your individual needs can be selected. Whether it be field house, stationary installation or the installation of backstops where it is necessary to remove them for other activities, Nurre Standardized Plate Glass Banks can be installed by your local contractor to meet your requirements. A complete catalog is ready to be mailed on request.

SHOWING QUICK RAISING AND MOST RIGID TYPE SUSPENSION WITH HOISTING WINCH

ARCHITECT'S DRAWING SHOWING DIMENSIONS OF NURRE STANDARDIZED PLATE GLASS BASKETBALL BANKS



WALLACE & TIERNAN COMPANY, INC.

Manufacturers of Chlorine and Ammonia Control Apparatus

Main Office and Factory: Newark, New Jersey

"THE ONLY SAFE WATER IS A STERILIZED WATER"

BOSTON, BRIDGEPORT, BUFFALO, CHARLOTTE, CHATTANOOGA, CHICAGO, CLEVELAND, COLUMBUS, DALLAS, DENVER, DETROIT, FORT WORTH, HOUSTON, INDIANAPOLIS, JACKSONVILLE, KANSAS CITY, KNOXVILLE, LEXINGTON, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, NEW YORK CITY, OGDEN, OKLAHOMA CITY, OMAHA, PHILADELPHIA, PITTSBURGH, ROANOKE, SAN DIEGO, SAN FRANCISCO, SEATTLE, ST. LOUIS, SYRACUSE, WASHINGTON, D. C., WICHITA
WALLACE & TIERNAN LTD., TORONTO, MONTREAL, WINNIPEG
WALLACE & TIERNAN LTD., LONDON, ENGLAND

"SWIM IN DRINKING WATER"

With the school swimming pool firmly established as a part of the physical training program, efficient sterilization is necessarily important. School executives can do no better than to follow advice given in the Report of the Joint Committee of the American Public Health Association and the Conference of State Sanitary Engineers. This report, in part, states: "From all available information, the addition of chlorine either as a gas or water solution by use of proper apparatus is today the most satisfactory method of pool disinfection." Chlorine alone gives the residual penetrating action for the complete protection of bathers at every point in the pool. More than 3000 swimming pools of the United States today rely on W&T chlorinators for positive disinfection.

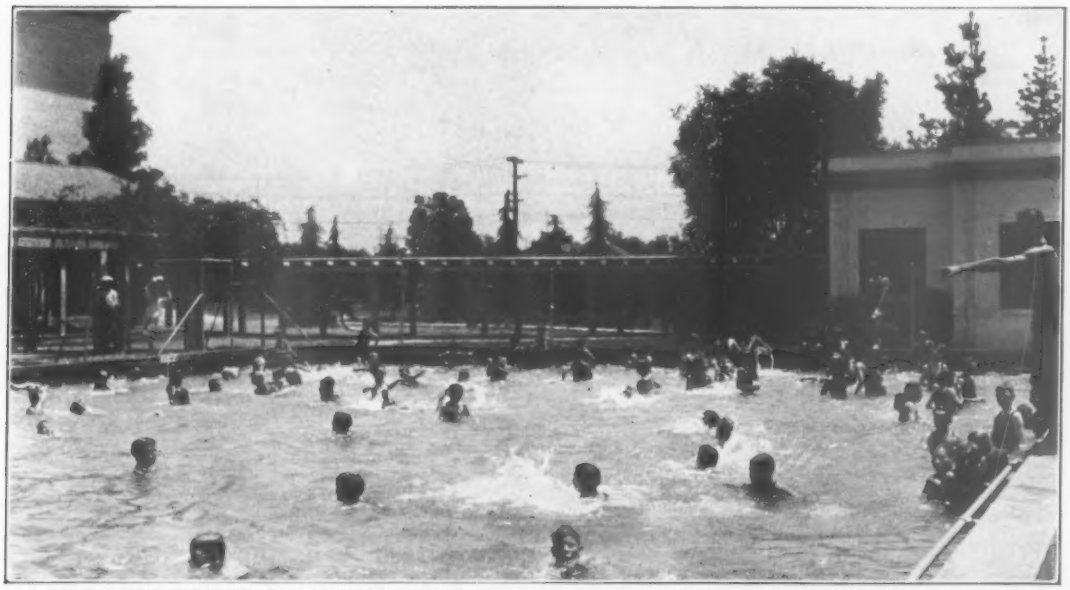
W&T TYPE MSP CHLORINATOR FOR THE STERILIZATION OF AVERAGE SIZED SWIMMING POOLS

W&T Type MSP Chlorinator—For the majority of medium-sized pools, this type machine is most suitable. It not only accurately controls the small amounts of chlorine but gives a feed range sufficiently wide to include all changes in bathing loads. All control parts are on the outside and a removable hood makes complete inspection possible at any time. Its simple construction and operation are readily understood by the practical pool attendant.

W&T Type MSV Chlorinator is the efficient sterilizer for large pools, having heavy bathing loads. Simplified design and sturdy construction have combined to make unusual performance records for this type of chlorinator. Of more than 3000 installed since the first went into service eight years ago, not a single machine has ever worn out. A survey of repair costs indicates average annual maintenance charges do not exceed one per cent of the initial investment.

W&T Ammoniator—Used with a W&T chlorinator for the production of chloramine. Chloramine is the most advanced method of pool sterilization. High chlorine residuals can be carried without objectionable tastes or odors. Chloramine rids filters and pool water of algæ growths—a real saving in operating costs. Savings of as much as $200 a season have resulted from the use of chloramine. W&T Ammoniators are made by the same rigid production standards and excellence of material as W&T chlorinators. W&T Ammoniators differ only in the special materials required for the efficient metering of ammonia.

W&T AMMONIATOR USED WITH A W&T CHLORINATOR TO PRODUCE CHLORAMINE



A W&T CHLORINATOR STERILIZES THE PASADENA HIGH SCHOOL POOL, PASADENA, CALIF., AT A COST OF LESS THAN 50 CENTS A MILLION GALLONS

W&T Chloro Clock accurately feeds predetermined quantities of sodium hypochlorite or similar solutions.

It is a simple machine which any one can understand and operate. The W&T Chloro Clock is ideal protection for the very small swimming pool.

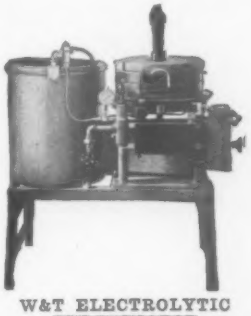
W&T Electrolytic Chlorinator—For swimming pool operators and other commercial users who wish apparatus to both manufacture and apply chlorine, the W&T Electrolytic Chlorinator is efficient, correct equipment. Its operating principle and rugged construction combine many features not obtainable in other electrolytic chlorinators. Fully aware of existing electrolytic chlorinator deficiencies, W&T have designed a chlorinator that will give satisfactory service over long periods with a minimum of trouble and maintenance costs.

W&T TYPE MSV CHLORINATOR FOR STERILIZATION OF LARGE POOLS

W&T Chlorine Comparator—Swimming Pool chlorination can only be controlled accurately, economically and safely when regular use of the ortho-tolidin test is made. The W&T Hellige Chlorine Comparator meets all requirements for a rugged, portable, accurate testing outfit. Its operation is so simple that accurate determinations of residual chlorine require only a moment's time and no specialized knowledge.

At Your Service—We are prepared to study any problems covering the sterilization of swimming pools and a nation-wide service organization is responsible for satisfactory performance of W&T equipment.

Current literature on the sanitation of swimming pools is available on request.



W&T ELECTROLYTIC CHLORINATOR

ANCHOR POST FENCE COMPANY

Complete Line of Playground Equipment

Baltimore, Md.

Sales Offices in Principal Cities

ANCHOR'S COMPLETE SERVICE FOR SCHOOL PLAYGROUNDS

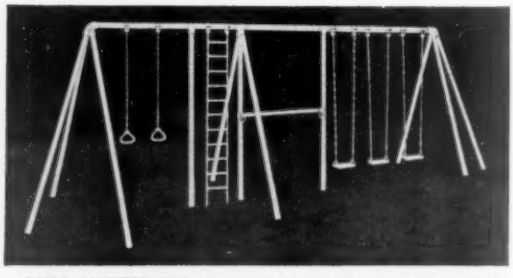
The Anchor Post Fence Company has been serving the playground market for over forty years, providing protective chain link fences for thousands of playgrounds throughout the country. The Company is now in a position to offer the playground field a **complete** service. We can furnish you playground devices to equip your playground; provide you with an Anchor fence to enclose your field; and offer you the services of skilled mechanics to install both equipment and fence.

The desirability of transacting business with one organization for all your school playground requirements cannot be too greatly emphasized, for in this way you get a **complete service** with **undivided responsibility.**

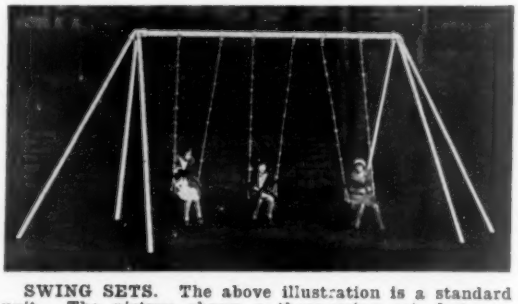
The Anchor line of playground equipment includes the following:

- The Ocean Wave
- Self-Propelled Swings
- Merry-Go-Rounds
- The Giant Stride
- The Kiddy-Go-Round
- Horizontal Ladders
- Single Chute Slides
- Double Chute Coaster Slides
- See-Saws
- Swing Sets
- Traveling Rings
- Gym Outfits
- Chain Link Tennis Fences
- Chain Link Wire Tennis Nets
- Basketball Equipment
- Baseball Backstops
- Flood Lights for Night Sports
- Steel Flag Poles
- Water Slides
- Diving Towers and Springboards
- Life Guard Lookout Chairs
- Pool Ladders

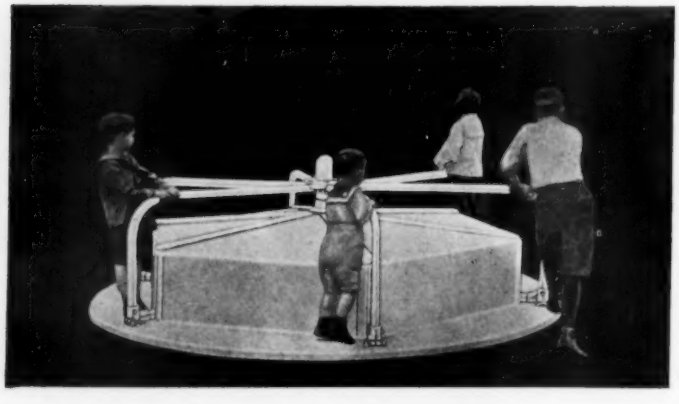
Write for illustrated booklet, "Anchor Playground Equipment"



GYM OUTFIT NO. B-4. This outfit was designed by request and has proven to be one of our best sellers. The purchaser has an option in ordering this unit. Aluminum flying rings or steel trapeze can be furnished to replace the ladder and climbing pole. The overall length at top is 36 feet; at ground 50 feet. The height is 14 feet. Pipe required: 1 piece 3½-inch pipe 21 feet long; 1 piece 3½-inch pipe 15 feet long; 8 pieces 2½-inch pipe 17 feet long, and 2 pieces 2½-inch pipe 16 feet long. All pipe dimensions are outside diameter. Three men can install this unit in 15 hours. Weight: Apparatus 360 lbs.; pipe 900 lbs.



SWING SETS. The above illustration is a standard unit. The picture shows a three-swing set, but any number of sections will be furnished to give as many swings as desired, in multiples of three. The framework is 12 feet high and is made of 3½-inch O.D. horizontal and 2½-inch O.D. support pipes. A choice of three types of swing seats is offered to fit your requirements.



THE MERRY-GO-ROUND (Type No. M-1)

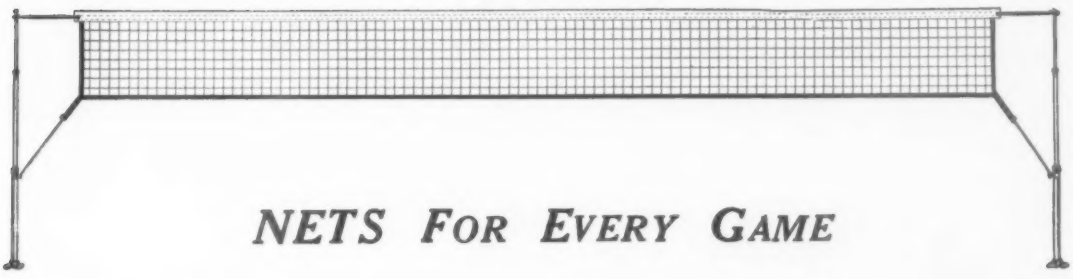
The Merry-Go-Round is a safe and economical piece of play equipment. It is safe because the running board is set close to the ground, thereby preventing a child from getting under or partly under it. It is economical; it is the cheapest device per passenger accommodated; it will accommodate as many as forty children at a time; and the operation is so free and easy that one child can start and keep it running. The outfit is shipped in sections and because of its singular simplicity it can be easily erected in a short time; assembling instructions furnished with shipping papers.

W. A. AUGUR, INC.

Fishermen's Nets and Twines, and Sport Nets

Established 1900

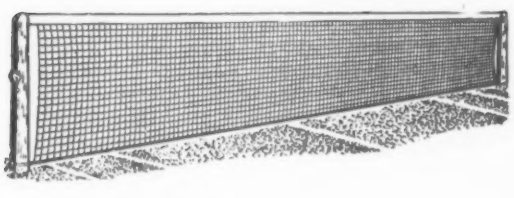
35 Fulton Street, New York, N. Y.



NETS FOR EVERY GAME

TENNIS NETS

A complete line is offered, from the light cotton nets for children's playgrounds to the heaviest tarred nets for tournament play. Also Volley Ball Nets, Badminton Nets, Paddle Tennis Nets, etc. Full list on request.



BACKSTOP NETS

Stock sizes are carried for tennis courts and other sizes are made to order as desired. Also nets for the side-lines of basketball courts, or for temporary partitions for gymnasiums.

GOLF PRACTICE OR DRIVING CAGES

Cages now make golf practice as a recreation, also golf instruction, possible at any time of year and without regard to weather conditions. We offer a full range of stock sizes, and make special sizes to order as desired.

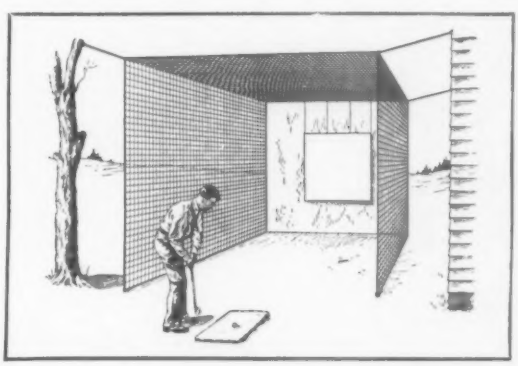
BASEBALL CAGE NETS

Made to any dimensions. Estimates promptly given.

OTHER NETS

Soccer Goal Nets, Hockey Goal Nets, Water Polo Goal Nets, etc., etc.

Our long experience in the manufacture of fishing nets enables us to produce the toughest and most durable of all Sport Nets; and it is this that is behind the reputation of Augur nets for **long life.**



BARRETT AUTOMATIC KEYLESS LOCK COMPANY

Upper Darby, Pa.

THE BARRETT AUTOMATIC KEYLESS LOCK

The most outstanding achievement of the keyless lock industry is the perfecting of a springless automatic padlock, as embodied in the **Barrett Automatic Keyless Lock.** School officials who equip their lockers with this wonderful system of perfected automatic locking will find they have put an end to their lock troubles—no keys to be lost, and no springs that may fail to function properly.

How It Works

When the shackle of the **Barrett Automatic Keyless Lock** is inserted into place, it automatically throws the combination off position, thus securing the lock and making it necessary to reset the entire combination before the lock can again be opened. And the most remarkable feature about this is that it is accomplished without the aid of a single spring.

Other Outstanding Features

Automatic locking is not the only outstanding feature of this perfect lock. It has a double locking arrangement that secures both ends of the shackle, adding greatly to its strength and durability. It cannot be turned off combination while open. And it contains the least number of parts that could be used to make a strong, substantial lock of this character.

The Master Chart System which accompanies each order of **Barrett Automatic Keyless Locks** gives a perfect check on each lock issued with the least amount of time involved.

Guarantee

Of simple, yet lasting construction, the **Barrett Automatic Keyless Lock** is unconditionally guaranteed against all defects over a five-year period.

School officials may have a sample of this perfect lock upon written request.

BARRETT AUTOMATIC KEYLESS DOOR LOCK

Locks automatically the moment the door is closed. Cannot be opened without resetting entire combination.

Standard size. Fits any style locker with exposed or concealed bolts in door.

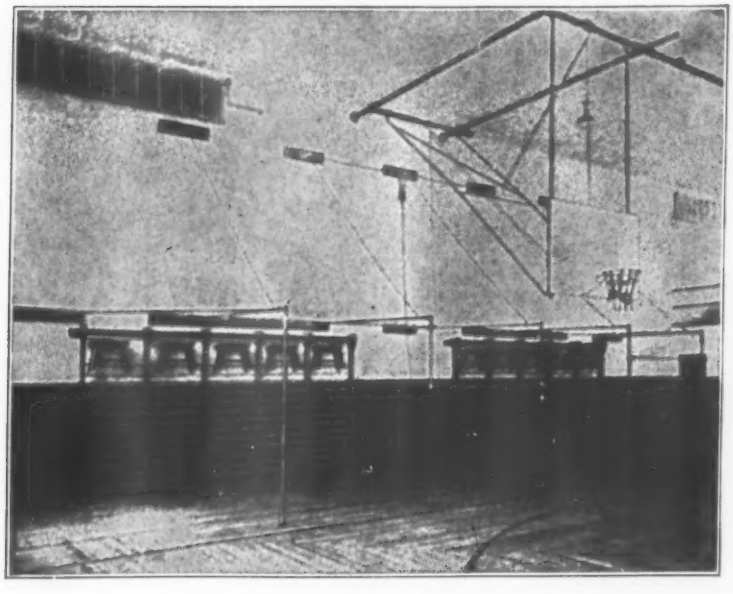
Permits easy change of combination.

Easily applied and cannot be placed on locker door incorrectly.

CHICAGO GYMNASIUM EQUIPMENT CO.

1827–1837 W. Lake Street, Chicago, Ill.

Manufacturers of



GYMNASIUM APPARATUS

WRESTLING MATS

SPRING BOARDS

VAULTING STANDS

ATHLETIC SUPPLIES

BEACH AND POOL EQUIPMENT

Send for Catalog No. 5

PLAYGROUND EQUIPMENT

We make a full line of:

SWINGS

SLIDES

PLAY FRAMES

SEE-SAWS

GIANT STRIDES

MERRY-GO-ROUNDS—TEETERS

Send for Catalog B

THE AMERICAN SCHOOL AND UNIVERSITY

EVERSON FILTER COMPANY

627 W. Lake Street, Chicago, Ill., U. S. A.

Everson Safety Swimming Pools

EVERSON Swimming Pools are safety pools that more than fulfill the most rigid Federal, State and Municipal health requirements. They embody a practical excellence resulting from over 28 years of specialization and unchallenged leadership in this field. During this time, EVERSON has pioneered the way, has led in research, development and construction. Starting with the Everson Re-Circulating System of continuous water purification, Everson products and activities in this field have grown till this company now supplies either complete swimming pools or any part thereof.

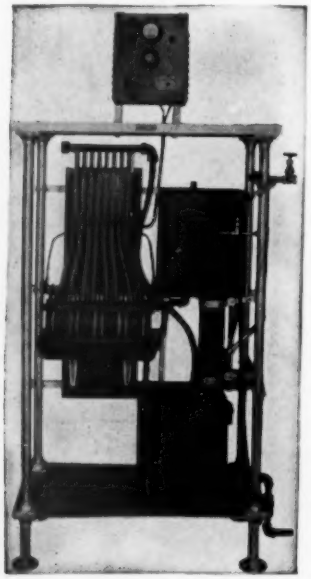
A TYPICAL EVERSON SAFETY POOL

AN OUTDOOR EVERSON SAFETY POOL

Estimates, Sketches, FREE

To members of Boards of Education, Civic Committees, Faculty Members, and to licensed engineers and architects, the Everson Filter Company offers, without charge, preliminary engineering service, advice, counsel, sketches and estimates for any proposed pool, or for the remodeling of any existing pool. Use this valuable service. It obligates you in no way. (See paragraph on Free Bulletins below.)

NEW EVERSON DEVELOPMENTS!



Jewell Electric Sterilizer

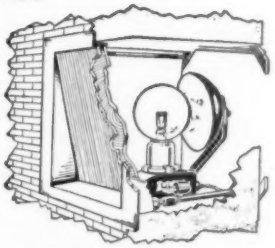
Keeps Pool Water Pure, Germ-Free, Safe.

This remarkable new unit, developed in the EVERSON laboratories, makes Sodium Hypochlorite for sterilization from ordinary rock salt and water, and *feeds it into the pool water in a safe non-irritating form.* Operating cost seldom exceeds ten cents per day. Circular on request.

Everson Underwater Lights

Beautify, Aid Instruction

Developed by Everson, these lights stop all glare, evenly illuminate every corner of the pool. Each detail of form and movement of swimmers is easily seen and many modern, staging effects are made possible.



Other Everson Equipment

- Filters
- Sterilizers
- Pumps and Motors
- Heaters
- Vacuum Cleaners
- Hair and Lint Catchers
- Built-in and Portable Suction Pool Cleaners
- Corametal (non-tarnishing) Pool Fittings

Write for Free Bulletins

Informative bulletins covering all phases of pool design, construction and maintenance will be sent free, upon request. Write to Everson Filter Co., 627 W. Lake Street, Chicago, U. S. A.

EVERSON SAFETY SWIMMING POOLS

THE AMERICAN SCHOOL AND UNIVERSITY

IRA E. FASNACHT, INC.

Ephrata, Penna.

Floodlights by Fasnacht

Use **Fasnacht Illumination** in the field of **glareless floodlighting,** for your night football, baseball, soccer, tennis, practice fields, running tracks and swimming pools. These floodlights are noted for their ease of installation and their efficiency.

The unit illustrated above is porcelain enameled, white inside and green outside with a socket housing and cap of cast aluminum. All fittings are rust proof and durable. The unit can be furnished with a ten-inch reflector of chromium where a long throw of light or a strong center beam is desired. This reflector can be revolved around the lamp to move the beam of light to the right or left, or it can be moved forward or back to change the focus and the spread of this beam. The floodlight accommodates any standard lamp size from 300 to 1500 watts. The bracket allows universal adjustment and will mount on any vertical surface of any pipe from 1½" to 3½".

Fasnacht manufactures a complete line of open type floodlights. A highly trained, efficient engineering department offers layouts and recommendations without obligation.

Spotlights

Illustrated below is the **Fasnacht 1000-watt Masterpiece Spot Light,** 5-inch lens, all castings of aluminum, all metals highly polished. Lamp housing 7½" wide, 12" long, 13½" high. Stand 4 feet high, base 18 inches in diameter, weight complete 20 pounds. Light adjustable to any position, can be changed from spotlight to floodlight instantly and while in use. The light comes with asbestos lead wire and connector. Any type bracket can be furnished for different mountings. A chromium-plated polished reflector may be added if desired. This increases lamp efficiency 40 per cent.

Color Effects

Fasnacht furnishes **Color Wheels** of all descriptions, mounted on cast aluminum frame that can be instantly installed on any type of spotlight. Compact, light and noiseless. Furnished with an assortment of colors.

Stereopticon Attachment

Consisting of an aluminum frame that fits a groove in front of the spot light, this attachment projects standard 3¼" x 4" slides. It is fully equipped with lenses, and neatly finished.

Also Made to Order

Illusionary devices, special effects for degree and other work.

Fasnacht also furnishes scenery, stage settings and electrical effects of every description. Send Fasnacht your stage lighting problems.

GENERAL ELECTRIC COMPANY

General Office: Schenectady, New York

SALES OFFICES IN PRINCIPAL CITIES

This Light Started Sports at Night

In the fall of 1923, Tufts College played the General Electric engineers on the Lynn Athletic Field by the light from the G.E. Novalux floodlighting projectors—the first football game at night.

Since then, this light, the General Electric type L-31 floodlight, improved year by year, has been popularizing outdoor sports at night. Under it, football, soccer, baseball, tennis, golf and hockey have been played successfully. Colleges, prep schools, high schools and civic bodies have adopted it for their fields. This totally enclosed floodlight can be used throughout the year for lighting of different athletic fields, pageants, college buildings, and parking areas.

In addition to this floodlight, an open type floodlight is available and can be readily adapted in more economical installations, to mounting on wooden poles. This open floodlight is impervious to the severest weather conditions, and furnishes an excellent job of lighting.

UNION COLLEGE HOCKEY COURT

Since the schedule of classes often prevents hockey and football practice before 5 o'clock in the afternoon, floodlights can be used practically every night.

Swimming pools can be lighted at a reasonable cost with a small specially designed underwater floodlight.

Tennis courts may be illuminated adequately by the use of either the open or closed types of floodlight.

What are some of the advantages of floodlighting? Here is an example of what the athletic manager of Temple University in Philadelphia thinks of it. "Since Temple put on night football, the student attendance has jumped 33⅓ per cent. Sixty per cent of our student enrollment of 13,000 work in the afternoon, and were unable to see the afternoon contests. Night football was virtually demanded by the students."

This opinion of the athletic manager partly explains why over 125 football fields have been permanently lighted by General Electric since 1930. Other reasons were the big increase in gate receipts, the minimized interference with classroom duties and, of course, perfect illumination.

So when you plan to floodlight your field, pool, hockey, rink, or tennis courts, have a G.E. lighting specialist look it over. He will give you complete information and recommendations from the famous General Electric Illuminating Engineering Laboratory—gladly and without obligation. You can get in touch with him through the nearest G.E. Sales Office.

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There are thousands of International Filters in service supplying clean, clear water for the general supply, drinking water, swimming pool, etc. Made in all types and sizes, capacities from 100 gallons per hour to millions of gallons per day.

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Soft water for the boiler plant, laundry, hot water lines or entire general supply, will effect savings that soon pay for an International Softening Plant. There is a type of International Softener to best meet your operating conditions.

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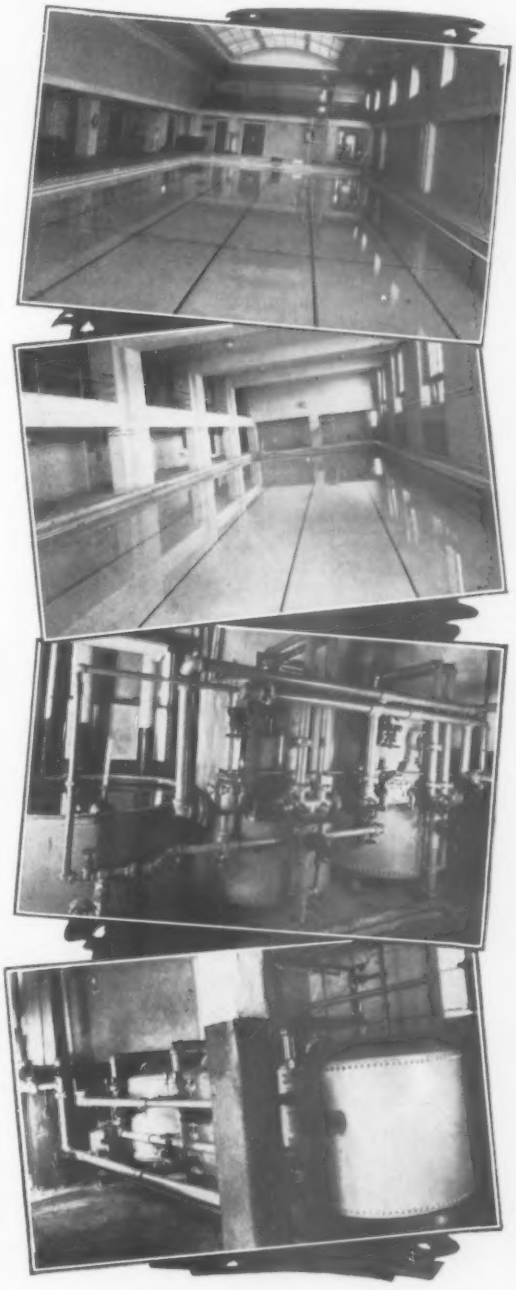
International Filter Co. specializes on complete water purification plants. A large laboratory and engineering staff is maintained to make reports and recommendations. This service is intended to co-operate and not conflict with the work of any representative or engineer of the prospective purchaser. You are invited to submit your problems.



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SINGLE-OUTLET HAIR DRYERS

Types

The Wall Model—Used mostly in the modernization of present buildings.

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Pedestal Models—This type is available in one, two and four outlet models, and is best adapted to present buildings or where insufficient wall space is available.

All models can be equipped with either push-button automatic time switches for face or hand drying or standard start and stop switches for hair drying.

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Do not require any more space than the usual single-outlet type and can be operated single or in multiple as may be required. Flexibility to suit demand.

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The enclosing case, base, adjustable nozzle and pedestal are made of highest grade grey cast iron heavily porcelain-enameled in any desired color.

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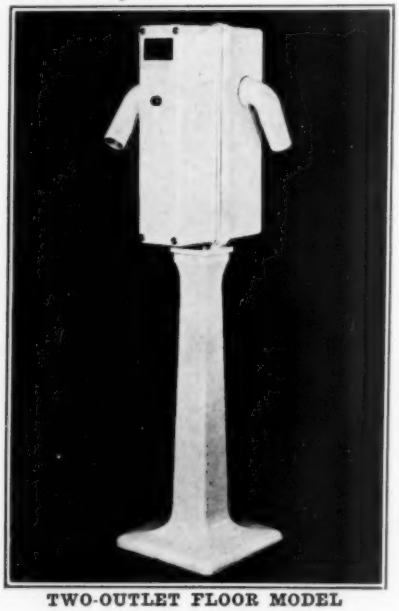

TWO-OUTLET FLOOR MODEL

DRYER DATA

No.	Type	Wall or Floor Space	Height Floor Models	Current Consumption	No. Outlets	Shipping Weight
1	Wall	5½″ x 5½″ x 20″		750 watts	1	60 lbs.
2	Built-in	5½″ x 5½″ x 20″		750 watts	1	60 lbs.
3	Pedestal	12″ x 12″	48″	750 watts	1	120 lbs.
4	"	12″ x 12″	48″	1500 watts	2	175 lbs.
5	"	12″ x 12″	48″	2250 watts	3	240 lbs.
6	"	12″ x 12″	48″	3000 watts	4	300 lbs.

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Attractive Prices

GUARANTEED SATISFACTION

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Champaign, Ill. (12 courts)
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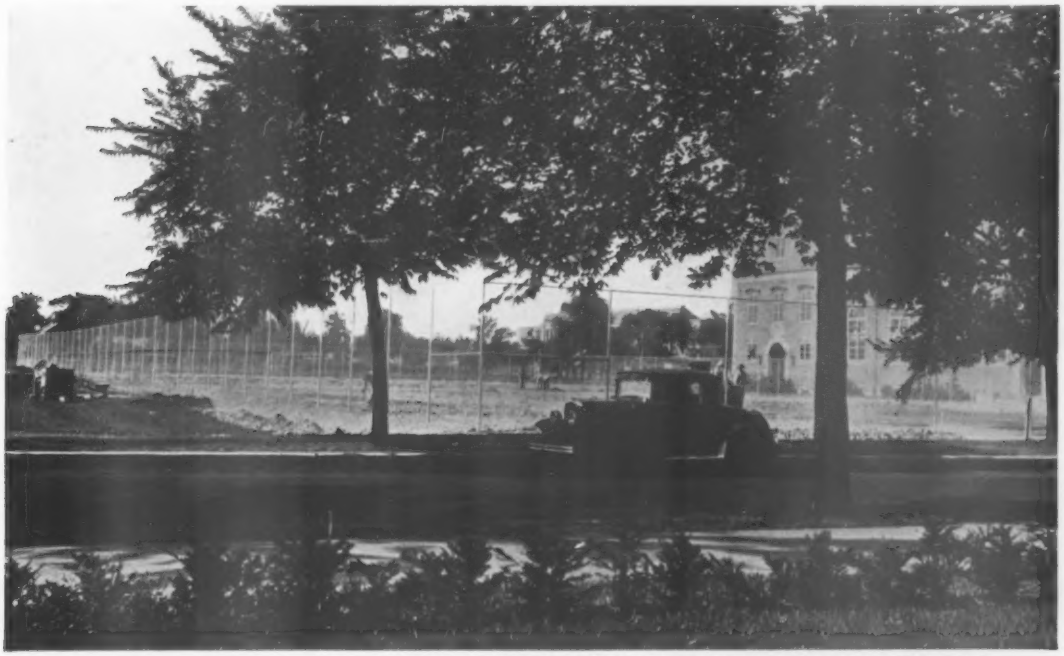

VIEW OF 12 COURTS WHILE UNDER CONSTRUCTION FOR THE UNIVERSITY OF ILLINOIS, CHAMPAIGN, ILL.

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FIG. 902
PEDESTAL FOUNTAIN. GUARD-BOWL, SLANT-STREAM BUBBLER

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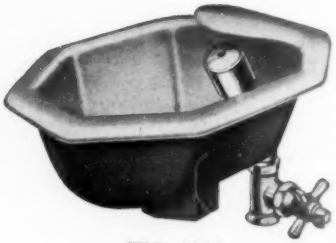

FIG. 927A
WALL BOWL WITH GUARD. SLANTING STREAM

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"Betterbilt" Playground Apparatus

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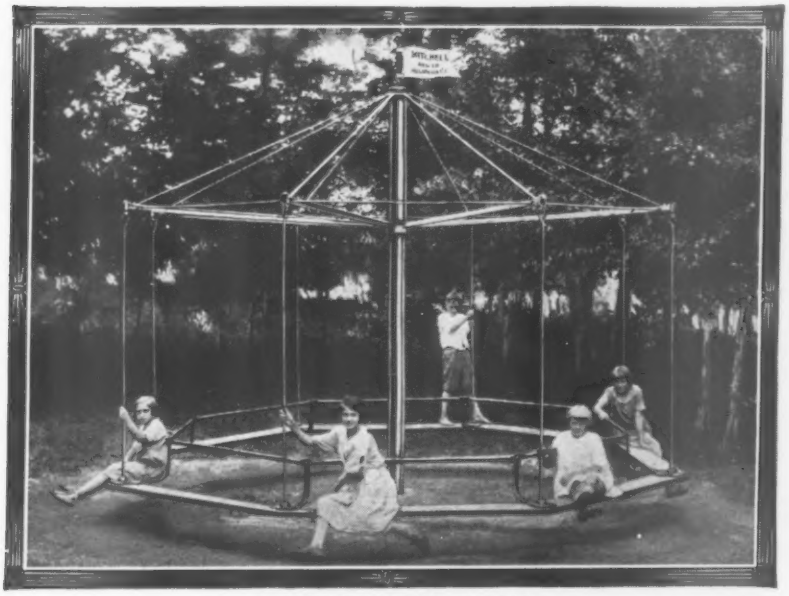

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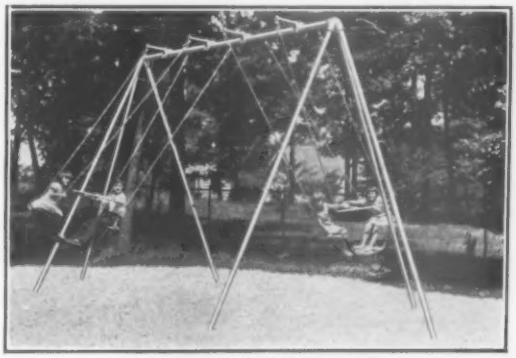
"Mitchell Products and service cannot be beat," writes W. H. Emery, Director of Physical Education, Oklahoma City, Okla.



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Gymnasium Catalog F

This catalog should be in the files of every purchaser of Gymnasium Apparatus.

The catalog numbers are used in specifications to identify the type of apparatus required.

A Manual of Gymnasium Construction is available in monograph form to Physical Directors, Building Committees and Architects.

Here can be found detailed information regarding the building of a gymnasium and special attention has been given to the problem of preparation of walls and ceilings for the attaching of apparatus.

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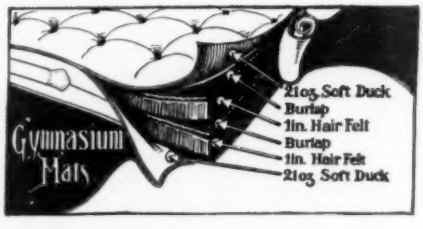

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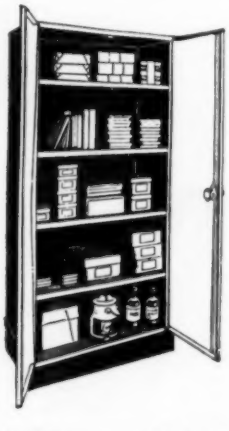

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The Swimming Pool at Temple University, Philadelphia, Pa.—One of the many large pools using PERCHLORON.

This new soluble powder, containing over 70% available chlorine—provides the easiest and most economical way to disinfect swimming pools and bath houses. It is easy to use. Requires no costly equipment or highly technical supervision.

The high chlorine content of Perchloron and its low cost make it possible to economically keep the water in your swimming pool safe at all times.

Use Perchloron solution to disinfect bath houses, gymnasiums, locker rooms, benches, floors and approaches to showers and pools so as to prevent the spread of Athlete's Foot; also provide shower pans containing this solution through which the bathers must walk on their way to the pool, as a further aid in preventing the spread of Athlete's Foot.

Use Perchloron also as a disinfectant for bath towels and bathing suits.

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on Drives, Tennis Courts, Playgrounds and Recreation Fields

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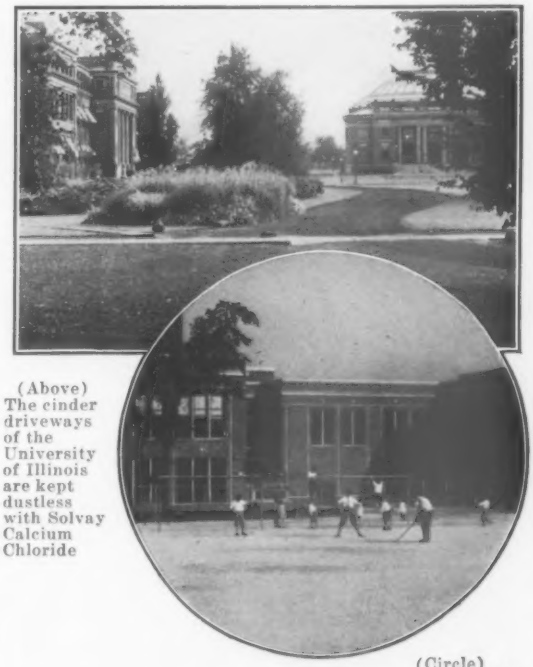

(Above) The cinder driveways of the University of Illinois are kept dustless with Solvay Calcium Chloride

(Circle) No dust on this Solvay-treated playground in Detroit

SOLVAY

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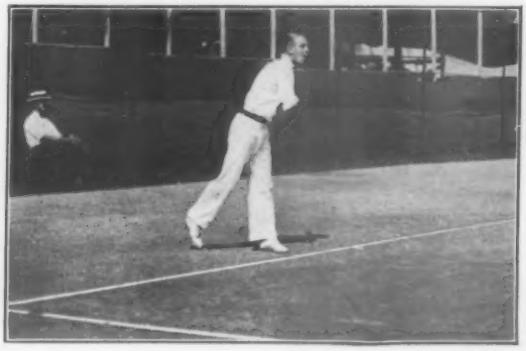
Calcium Chloride

Flake 77%-80%

At Friendship House, Washington, D. C., this playground is kept dustless with Solvay Calcium Chloride

Championship matches were played on the Solvay-treated courts of the Woodstock Club, Indianapolis



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TILITE—For cleaning white tile, terrazzo, marble, porcelain, etc.; also for cleaning brass and bronze.

ERUSTICATOR—Rust stain remover; absolutely safe for all kinds of fabrics and colors.

ERUSTO SOLVENT—For grease, oil, tar and printing ink stains.

ERUSTOLAX—"The Dirt Laxative." Softens dirt in clothes, acting as an aid to soap and detergent in removing dirt. Powerful grease stain remover.

EZEWAX—New, easily applied wax finish for linoleum, hard or soft wood, terrazzo, or other floor surfaces. Also for furniture and woodwork.

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Good detergents will remove surface dirt but not embedded dirt, stains, discolorations, etc.

A good tile cleaner must employ both chemical and abrasive action. An abrasive harsh enough to remove embedded dirt and stains would wear down the tile. The abrasive must be so fine and soft that it will remove surface dirt and ordinary stains but will in no way mar the polish or luster of the tile. The chemical cleansing also must be accomplished safely.

Harmful Acids

Muriatic Acid is sometimes used for cleaning when tile becomes badly stained or discolored. But the fact that it is used to remove surplus cement from newly laid tile proves that muriatic acid is a dangerous cleaner for tile; it will gradually eat away the cement grouting from between the tiles. Tile cleaners containing this acid should be avoided.

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The chemical ingredients of **TILITE** give it maximum cleansing and stain-removing power with absolute safety to the tile and the cement. The abrasive in **TILITE** is so soft and smooth that, in a whiter form, it is used as the base for a tooth-paste. **TILITE** is exceptionally effective for removing iron rust stains, discolorations, waxy dirt, soapy deposits, embedded dirt, oil and grease stains, etc., leaving the tile glisteningly clean and polished.

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TYPE CAG-14 FLOODLIGHT

Floodlighting projectors are made in a variety of types and sizes to meet every lighting requirement. Among the many distinctive features are high efficiency, low maintenance and long, carefree service.

Westinghouse floodlights are of cast silicon aluminum, sheet aluminum, sheet copper, or sheet steel. With the exception of the open type porcelain-enameled floodlights, the housing used is of the unventilated type and depends upon radiation alone for heat dissipation. This makes the unit dust-proof and weather-proof and

DEXTER PARK, BASEBALL FIELD, LONG ISLAND, N. Y., WITH LIGHTING UNITS FOCUSED FOR A BOXING MATCH. UNITS MAY BE REFOCUSED AND DIRECTED FOR BASEBALL OR OTHER SPORTS

thereby protects the interior from deterioration and minimizes depreciation.

Silvered glass or chromium plate forms the reflecting surfaces of these floodlights. Each has its advantages; silvered glass has higher initial efficiency and is less likely to corrode than any other material. Frequent cleaning of this mirror is desirable. Chromium plate is slightly less efficient when first installed, but over long periods at high temperatures or extreme temperature fluctuations, it often gives the best average results. It is not broken by either excessive temperature or rough usage. Cleaning may be at infrequent intervals. Its original condition can be restored by buffing. Both are very resistant to abrasions and are easily cleaned.

All floodlights are provided with mounting brackets or bases which permit universal adjustment in any direction. Focusing the lamp is accomplished by merely adjusting the external thumb screws.

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TYPE W AQUALUX UNDERWATER FLOODLIGHT

Aqualux or underwater projectors, in addition to transforming the ordinary pool into a pleasing place for a swim, provide a feeling of new safety, of mental and physical ease. Since every movement below the water's surface may be seen, the finest technique and most thrilling action is presented in striking silhouette. Larger audiences can take advantage of evening performances, and a lighted pool is a colorful and unusual attraction that will win increasing patronage for water sports.

Likewise, underwater projectors transform the ornamental fountain into a myriad of glistening jewels, reflecting the various colors of the rainbow.

Aqualux or underwater floodlights possess the same features of simple design and rapid servicing as the other floodlights.

SWIMMING POOLS ARE TWICE AS USEFUL WHEN ILLUMINATED BY A WELL-DESIGNED AND ADEQUATE LIGHTING INSTALLATION

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The Williams Iron Works are manufacturers of permanent and portable steel bleachers for stadiums, athletic fields and gymnasiums.

They are specified as standard equipment by the Boards of Education in many cities throughout the United States.

Easily erected and stored in little space. They last forever with a minimum of upkeep.

Our engineers will be glad to design or to advise you on your particular bleacher problem.

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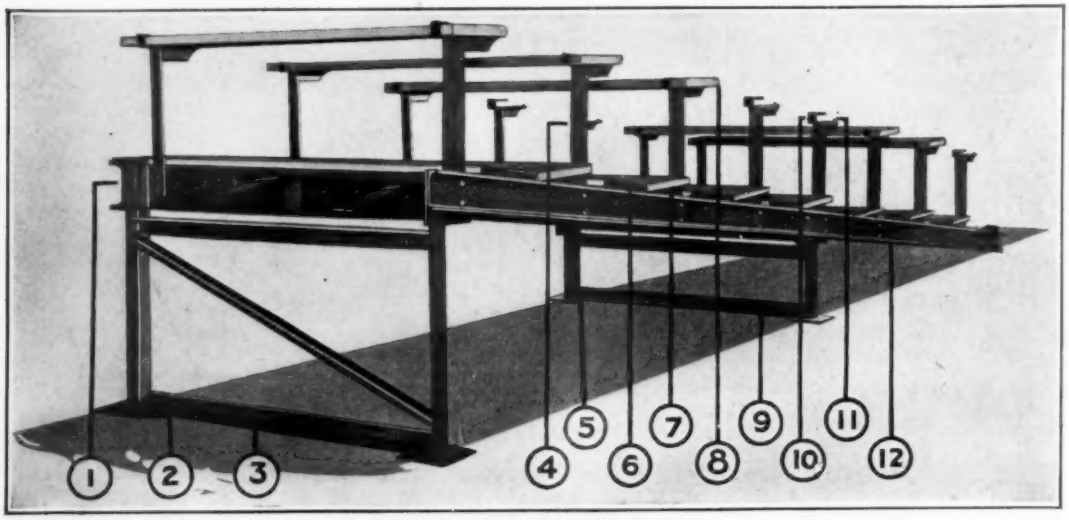


DETAIL OF CONSTRUCTION

CLASSROOM—LIBRARY—AUDITORIUM—COMMERCIAL DEPARTMENT

Planning Classrooms for Elementary Schools

By RAYMOND V. LONG

Director of School Buildings, State Board of Education, Richmond, Va.; President, National Council on Schoolhouse Construction

ONE of the greatest difficulties confronting the school administrator and the school architect in planning a school building is the lack of objective standards for determining how classrooms should be planned to best serve the ever-changing conception of education. Not only does the continuing change in educational concepts affect the problem, but the wide variation in curricula and course-of-study content between different states and the communities within a state makes even more difficult and uncertain any definite standards for classroom planning.

The situation is further complicated by the findings of recent studies on such subjects as ventilation, lighting, the proper allotment of air space and floor space, the required amount of blackboard space, the merits of wardrobes vs. cloakrooms vs. lockers, etc. Any one who would offer as the complete solution to the problem one classroom plan for all types of schools and all sections and communities of the country would properly receive or merit little support from those who have carefully studied the problem.

Classrooms can be intelligently and satisfactorily planned only in terms of the curriculum and course of study to be offered. Even this broad general governing factor will not hold if funds are inadequate. In a large number of cases, limited funds and a fixed number of pupils to be accommodated will necessitate the elimination of many desirable features that classrooms should provide.

The National Council's Contribution

The National Council on Schoolhouse Construction at its 1931 meeting adopted a number of standards for use in planning elementary classrooms. Copies may be secured from the Council's Secretary, William C. Bruce, American School Board Journal, Milwaukee, Wis., for a small charge. The standards describe various details of planning and arrangement that may be regarded as the minimum requirements for elementary classrooms. A study of the standards will reveal that they are not intended to cover the whole field of classroom planning, and that they lack definiteness on many points on which there are wide differences of opinion.

The purpose of this article is to offer some layouts which are generally regarded as good and which may serve as guides to architects and administrators in classroom planning. The foregoing discussion clearly explains that the layouts should not be accepted as final recommendations either in general arrangement or in detail.

With the present lack of unanimity of opinion as to what the curriculum and course of study should be, it is inevitable as well as commendable that many communities should experiment with classroom planning that is designed to meet the needs of the "transitional school." Just what the so-called "transitional school" will develop into, and what the next few years may determine in the way of revised curricula, no one can tell. Large expenditures in classroom planning to meet the new type of school do not, however, seem to be warranted except for experimental purposes in those communities in which the educational leadership can justify experimental planning. It is safe to say that for a good many years to come the large majority of school buildings will continue to be "conventional" in plan, particularly in the case of elementary, rural, and small-town consolidated schools.

Conventional Classrooms Are Needed in Most Schools

The conventional classroom is designed to seat about forty pupils, is generally uniform as to size and is provided with wardrobe or cloakroom, blackboards, bookcase, storage space, teacher's closet, bulletin board, usually a display board or tacking strip, standard provisions for light, both natural and artificial, and adequate provisions for heat and ventilation. The "transitional" classroom may be described as a unit for instructional purposes so designed, arranged, and equipped that improved instruction methods may be employed to interpret the curriculum more readily and completely to the pupil. Perhaps in a few years architects and administrators will know in some detail what this means and how to accommodate such a program. In the meantime it behooves us to adhere in general to the conventional classroom and the best standards we know.

Recommended Standards

Some standards for classroom planning, on which authorities are generally agreed, are described below and may be used by school administrators and architects with reasonable assurance that the complex demands of new curricula and improved methods of teaching will be met with a fair degree of satisfaction:

1. *Dimensions of Classroom.*—The width of a classroom should be not more than twice its height. A room 22 feet wide by 30 feet long will be found a usable and satisfactory size to accommodate 40 elementary school pupils. Under normal conditions the height of the room should be 12 feet.

At the front end of the room, approximately 3 feet should be provided between the first row of seats and the front wall. At least 3 feet should be provided between the last row of seats and the rear wall. This distance should be increased if the wardrobe is at the rear end of the room.

2. *Seating Capacity.*—The seating capacity of classrooms should be determined by allowing not less than 16 square feet of floor area for each pupil.

3. *Aisles.*—Doors to classrooms should be not less than 3 feet wide by 7 feet high by 1¾ inches thick. A clear glass pane in the upper part of the door is a desirable feature.

4. *Location of Windows.*—All classrooms should be provided with unilateral light, or light from one side only. Windows should be placed on the long axis of the room. Light from the east or west is preferable to light from the north or south. The top glass of the window sash should be not more than 8 inches below the ceiling. No window glass should be placed so low that light enters the room below the plane of vision of pupils sitting next to the windows.

5. *Glass Area of Windows.*—The ratio of glass area to floor area should be governed by the intensity of illumination. For different sections of the country the ratio of required glass area will vary from one-quarter to one-sixth the floor area.

6. *Artificial Illumination.*—Lighting units, properly inclosed to prevent direct glare, should be hung so as to insure an illumination of at least 8 foot-candles at the pupils' desks.

7. *Color of Walls and Ceilings.*—All walls should be of a color that has a reflection factor of not less than 30 per cent nor more than 50 per cent. The ceilings should be ivory white or a light cream, with a reflection factor of not less than 60 per cent.

8. *Blackboards.*—Each classroom should have not less than 30 running feet of blackboards, which should be not more than 42 inches in width. The height of the chalk trough above the floor should be as follows:

First and second grades	24 to 28 inches
Third and fourth grades	26 to 30 inches
Fifth and sixth grades	28 to 32 inches
Seventh and eighth grades	30 to 36 inches

9. *Coat Rooms and Wardrobes.*—Each classroom should be provided with a suitable space for children's outer garments, such as either (a) or (b):

(a) A ventilated coatroom, 5 feet wide, with an outside window having a glass area of not less than 1 square foot to every 10 square feet of area; also two hook strips placed respectively 3½ and 5 feet above the floor, each equipped with hooks, staggered 18 inches apart. Poles equipped with hangers may be substituted for hook strips. In addition, a shelf should be provided above the coat strips or poles for the accommodation of lunch baskets and other pupil property.

(b) An easily accessible ventilated wardrobe opening into the classroom, provided with hook strips or poles and brackets, and a shelf over the hook strips or poles and brackets [see (a) above].

10. *Bulletin Board and Display Board.*—A bulletin board should be provided in each classroom; it should be not less than 3 feet wide and the same height as the blackboard, and should consist of cork carpet, cork board or heavily compressed insulating board that will readily take and hold thumb tacks. It should be either at the front of the room or near the front on the side. A display board is generally considered desirable, and in many cases is necessary. It should be about 12 inches wide, the entire length of the blackboard, of the same kind of material as the bulletin board.

11. *Bookcase.*—In each classroom there should be provided a bookcase, equipped with lock and key, to accommodate at least 100 standard volumes.

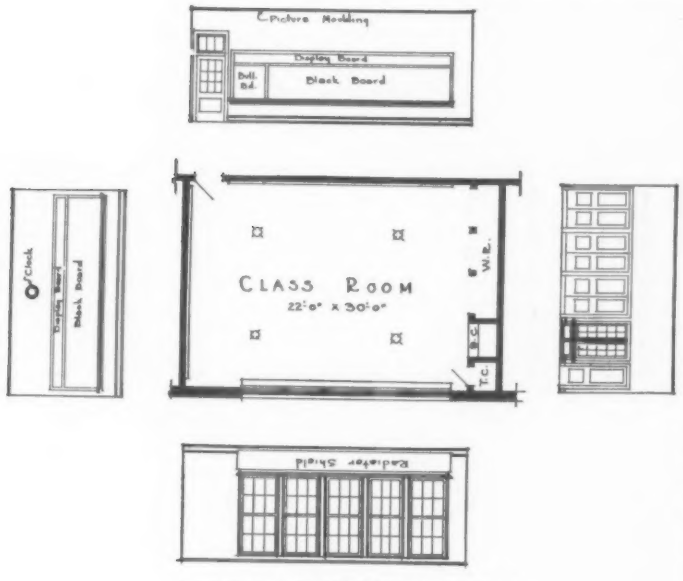
12. *Teacher's Closet.*—In each classroom a teacher's closet, with at least one shelf approximately 11 inches wide, should be provided. Such closets should preferably contain a number of shelves for housing supplementary equipment.

13. *Picture Molding.*—There should be provided around the entire classroom near the ceiling a picture molding. Although its use will vary with different teachers, different types of classroom, different grades and different seasons, it will be found desirable and necessary.

14. *Supplementary Equipment.*—In addition to the provisions listed, serious consideration should be given to providing a classroom clock, temperature control, electric outlets for supplementary light, lantern projection, interphone connections, radio connections, and lavatory and drinking facilities.

Plan No. 1

The accompanying plans offer three suggestive classroom layouts. In each case the room is



A TYPICAL CLASSROOM, PLAN NO. 1

22 x 30 x 12. Plan No. 1 is the one most commonly used. One of its advantages is that it provides blackboards on the front and right side of the room, the proper location if that much blackboard space is required. Those who have studied the subject recently believe that this amount of blackboard space is neither necessary nor desirable. A disadvantage of the layout is that the room is inflexible. It does not permit tearing out partitions if it should be necessary to enlarge the room in the future.

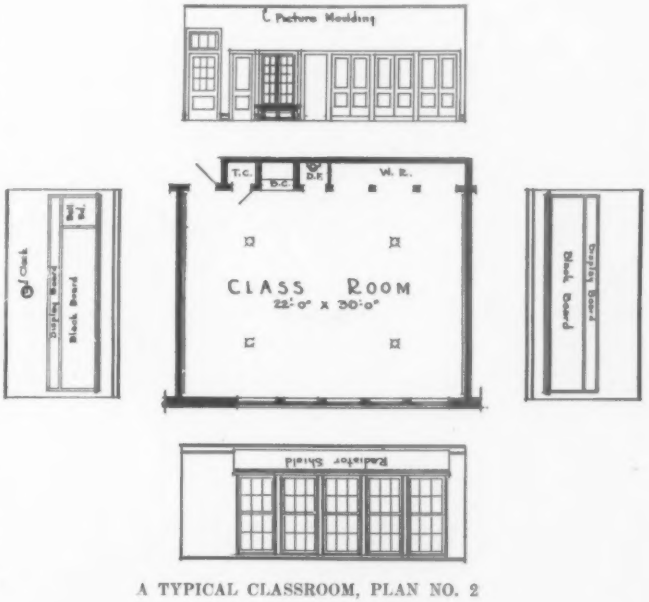
Plan No. 2

Plan No. 2 provides for a blackboard across the front, and for either a blackboard or a bulletin board across the rear of the room. The amount of floor space for the entire unit is slightly larger than the floor space in Plan No. 1, but it offers the additional advantage of providing recessed space for a drinking fountain and a lavatory. In addition, Plan No. 2 provides better facilities for ventilation if the window gravity system is used, the ventilation being provided under the wardrobe doors and through the ceiling of the wardrobe. The wardrobe doors are hung about 6 inches off the floor. In every case it is recommended that wardrobe doors be hung on one of several makes of patented hinges that permit the door to recess when open and not extrude into the classroom. Plan No. 2 provides better access to the teacher's closet, bookcase and wardrobe. It also makes possible the economical removal of partitions to enlarge or reduce the size of room.

Plan No. 3

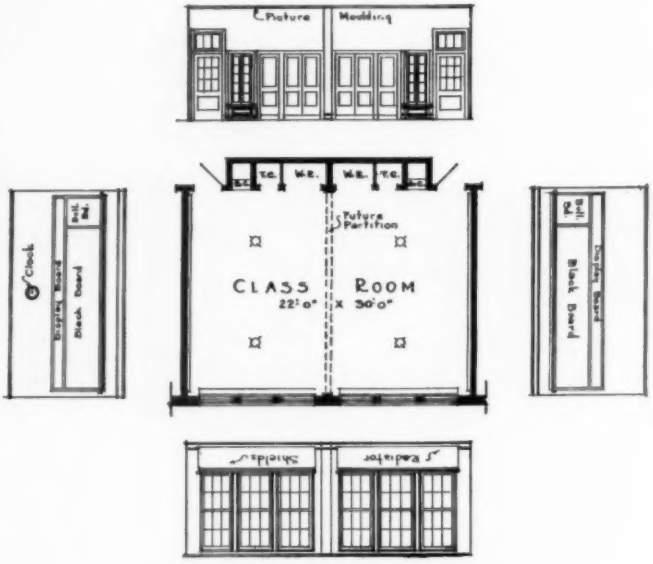
The layout suggested in Plan No. 3 offers a solution to the problem of planning for classes whose size fluctuates, and for cases in which there will in all probability be a demand for flexibility in the size and number of rooms. This condition arises particularly in rural and small-town consolidated schools in which there are combinations of elementary and high school grades. In a number of cases the high school enrolment is insufficient to warrant setting aside a full-size classroom specifically for the upper high school grades. If the third and fourth year classes in high school do not exceed twenty or thirty pupils, it is obviously wasting space to provide them with full-size classrooms. Layout No. 3 is offered to meet this condition, as well as to make it reasonably possible and easy to enlarge classrooms by means of temporary partitions.

Plan No. 3 is suggested for the consolidated type of school in which three or four of the classrooms at least may need to be modified in size to accommodate study halls, small recitation rooms and larger classrooms. This can be done at relatively small expense by building each unit half the size of a standard classroom. It then becomes easy to make changes to accommodate classes of various sizes.



A TYPICAL CLASSROOM, PLAN NO. 2

As stated above, no set of recommendations can be made that will fully meet the demands of all communities and all types of schools. Unless a very definite curriculum and course of study have been determined, and the educational tools to be used in interpreting such curriculum specifically set up, those responsible for planning need not expect that their elementary classrooms will meet all the varying needs offered or desired. It is felt, however, that the standards and layouts suggested are successfully adapted to the type of elementary school program that is likely to prevail for some time to come. Variations from the conventional type of planning may and should be made in those communities where the educational membership warrants and where the educational policies are fairly definitely established.



A TYPICAL CLASSROOM, PLAN NO. 3

The Administration of Visual Aids in Education

BY JOHN A. HOLLINGER

DIRECTOR, DEPARTMENT OF SCIENCE, PITTSBURGH PUBLIC SCHOOLS, PITTSBURGH, PA.

FOR the effective use of visual aids in education, the materials must be made conveniently available for teachers. Visual aids are most effective when used in the classroom as an integral part of instructional procedure. At the present time, however, they are more generally used in assembly or extra-curricular programs. Two types of materials are thus evident. Such phases of visual instruction as field trips, excursions, school journeys, pageantry and dramatization, which should be an important part of school work, are considered outside the scope of this article.

Classroom Aids Should Be Kept in the School Building

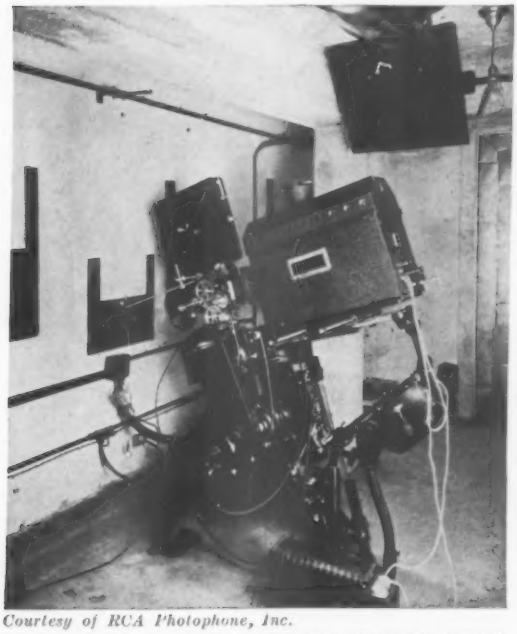
Visual aids for specific classroom use should be permanently located in the school building and should be owned by the school district. The materials must be catalogued, properly indexed, and carefully stored so as to be readily available when wanted by teachers. One lantern slide or a particular specimen may be needed for one class period, others for other periods. Recommended storage equipment for a visual aids library includes cabinets for lantern slides and stereographs; regular library shelving for motion picture films (only slow-burning acetate cellulose films should be purchased); folders for "flat" pictures (photographic prints); and storage cases for specimens, models, charts, maps, posters, etc.

A Competent Person Should Be in Charge

The school librarian should have direct charge of these content materials. Distribution with dispatch and prompt return to the storage place are essential. Records of loans must be accurately kept so that the borrower may be held responsible for return of materials in good condition. A librarian is trained and experienced in these duties and can perform them better than any other individual in the school.

If there is no librarian, the duties may be performed by the principal, assisted by a clerk, or they may be definitely delegated to some one else. One person in each school should be familiar with the content of visual aids and should be able to advise teachers concerning their use.

A licensed operator of 35 mm. (standard) motion picture projectors is also required. A teacher with mechanical aptitude may obtain this license. To him could then be delegated all the duties pertaining to projection equipment. Only he should operate carbon arc projectors. He might instruct other teachers to manipulate projectors under his direction. Among his duties are the following: (1) supervising the proper storage of equipment



Courtesy of RCA Photophone, Inc.

STANDARD-SIZE SOUND MOTION PICTURE EQUIPMENT INSTALLED IN THE PROJECTION BOOTH OF THE WARREN HARDING HIGH SCHOOL, BRIDGEPORT, CONN.

for protection from dust and theft; (2) keeping all projectors in good working condition; (3) repairing breaks in motion picture films in the school's permanent library; (4) moistening regularly, once each month, the humidor containers of motion pictures.

General Materials Should Be Centralized

Visual aids for general use in auditorium or other assembly programs, extra-curricular activities and similar occasions may be circulated in a school system from a central distributing library. Such materials for mass instruction must have general appeal of a scientific, social, historical, artistic, vocational or similar nature. They may also have recreational value. Schools should be careful, however, to avoid entertainment features except for very special occasions. Entertainment belongs to the theatrical field, well outside of the schools' province.

Most of the material circulated in a school district should be *owned* by the district. Several school buildings or several school districts may organize an exchange among themselves so that each may have the advantage of using the visual aids owned by others in the group. The longer the range of a distribution system, however, the less effective and more expensive it is likely to become, although some state departments and some university extension divisions have excellent libraries of visual aids and render splendid service in their communities.

To get worthwhile results, there must be sufficient personnel and equipment to render prompt and efficient service. Mere circuiting of visual

THE MOTION PICTURE FILM DIVISION OF THE ST. LOUIS, MO., EDUCATIONAL MUSEUM

aids has doubtful educational value. Requisitions from individual schools should be received at the central library sufficiently far in advance of the time when materials are wanted to afford an opportunity to make proper reservations. Good results are evident when schools requisition material for a whole term's work at the beginning of the semester.

Space and Equipment Requirements

The operation of a circulating library requires: a general office with telephones; two desks, one for the director in charge and one for the booker; a cabinet for filing records of reservations and other necessary data; and upright files for correspondence, requisitions, catalogs, etc. A projection and conference room is also essential. It may be small, not more than 15 x 30 feet, equipped with projectors, a screen, and facilities for darkening the windows.

At least 800 square feet of storage and work room floor space is necessary. Furniture should include a packer's desk, a receiver's desk, and a rewinding table, properly equipped with lamps for inspecting motion picture films, and with a patching outfit for repairing films. The amount

A FILM-REWINDING TABLE IN THE PITTSBURGH PUBLIC SCHOOLS

of storage space required depends of course upon the types and quantities of materials to be stored. As indicated above, there may be lantern slides, motion picture films, photographic prints (flat pictures), museum specimens and other traveling exhibits.

Lantern slides may be stored individually or in

St. Louis photographs by courtesy of the Board of Education

THE BIRD STORAGE SHELVES OF THE ST. LOUIS EDUCATIONAL MUSEUM

sets, as the demands may require. Sets of slides may be stored in shipping boxes to contain 25 lantern slides or less, or in boxes containing 50 slides. Very seldom are packing boxes required to contain more than 50 slides. The Clifford B. Connelley Trade School in Pittsburgh makes excellent lantern-slide boxes for use in the local school district. Motion picture films may be stored in the containers in which they are shipped to the individual schools. These, as well as the lantern-slide boxes, may be numbered perma-

Courtesy of Da-Lite Screen Co., Inc.
A FOLDING PORTABLE SCREEN

nently according to the numbers in the library's catalog.

The minimum equipment of visual and other sensory aids has been tentatively determined by visual education committees of Pennsylvania state teachers colleges. A statement of what comprises such equipment may be secured from C. F. Hoban, Director of Visual Instruction, Harrisburg, Pa.

Motion pictures synchronized with sound are finding their way into the educational field. Materials of general interest for use in auditoriums or other assembly and extra-curricular activities are now available. For specific classroom uses materials are developing more slowly.

Projection Equipment

Projection equipment in an individual school building should include at least:

Courtesy of Keystone View Co.
A KIT FOR MAKING LANTERN SLIDES

1. One lantern slide projector on a portable stand, for each floor of the building.
2. One 16-mm. motion-picture projector for every twenty classrooms or less.
3. One 35-mm. motion-picture projector for use in the auditorium or assembly room:
   a. A projector with a 1,000-watt lamp, if the distance from the projector to the screen is not more than 70 feet.
   b. A carbon-arc projector if the distance from the projector to the screen is more than 70 ft.
4. A convenience outlet in each classroom for electric current.
5. A screen for classroom use, varying in size from 30 x 40 inches up to 6 x 8 feet. Various types are on the market, including tripod-cabinet-table models. Effective screens may be made by carefully painting discarded window shades, mounting them on backboards with screw eyes for convenient hanging. Such screens can easily be transported from one classroom to another. A screen painted on the classroom wall is quite satisfactory.

Courtesy of Keystone View Co.
A FILING CABINET FOR STEREOGRAPHS AND SLIDES

7. A device with which teachers may make "home-made" slides.
8. Adequate auditorium equipment, including:
   a. A projection booth constructed according to local legal requirements.
   b. Immediate control of the auditorium lights from the booth.
   c. A reverse signal system from the stage to the booth.
   d. A screen 12 feet or more wide, mounted on a rigid frame (if the auditorium seats 300 or more).
   e. Provisions for darkening the auditorium by means of opaque shades or draperies.

If visual aids are to take their proper place in the educational program, an annual appropriation of at least $1 per pupil should be included in the school budget.

Selected References

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3. Visual Instruction Directory.—E. C. Dent, University of Kansas, Lawrence, Kans.
4. Educational Monographs.—Department of Public Instruction, Harrisburg, Pa.:
   a. "Visual Education and the School Journey."
   b. "Visual Education—The Object, Specimen, Model, and A Blackboard Technique.
   c. "Minimum Standard Equipment of Visual and Other Sensory Materials."

5. Dorris, Anna V.: "Visual Instruction in the Public Schools."—Ginn and Co. 481 pp. 1928.
6. Ben C. Wood and Frank N. Freeman: "Motion Pictures in the Classroom."—Houghton Mifflin Co. 392 pp. 1929.
7. Daniel C. Knowlton and J. Warren Tilton: "Motion Pictures in History Teaching."—Yale University Press. 182 pp. 1929.
8. "Handbook for the Use of Visual Aids."—Board of Public Education, Pittsburgh, Pa. 117 pp. 1931.
9. F. H. Richardson: "Handbook of Projection," 5th edition, 1930, in 3 volumes.—Chalmers Publishing Co.

Professional organizations include the Department of Visual Instruction, National Education Association (see annual report of Proceedings of National Education Association—Information may be secured from the Secretary, National Education Association, Washington, D. C.); and the visual instruction sections of various state teachers associations (see Visual Instruction Directory, Ellsworth C. Dent, University of Kansas, Lawrence, Kans.).

A Well-Integrated Public School Library

The James Monroe Junior High School Library, Seattle

BY THOMAS R. COLE

PROFESSOR OF EDUCATION, UNIVERSITY OF WASHINGTON
(FORMERLY SUPERINTENDENT OF SCHOOLS, SEATTLE, WASH.)

THE Seattle public schools have been committed for years to an extensive use of libraries as a part of the regular system of instruction. The senior high schools were among the first in the country to adopt and develop the plan of supervised study which calls for the use of reference books in the regular library as well as the furnishing of room libraries in different subjects. The following statement expresses one of the four objectives of the elementary schools:

"Further improvement in both silent and audience reading.—It is not enough that children learn how to read, but they should acquire permanent habits of reading that will promote both their formal education and their informal self-education after they leave school. The work in reading is organized so that children beginning in the primary grades are encouraged to do much general reading of a recreational and cultural as well as informational type. Progress is being made in the *development of elementary school libraries.* Recently a plan was adopted for the close cooperation of the public library with the public schools in this development. The schools are greatly concerned in the outside reading habits of children."

Cooperation with the Public Library

Junior high schools were introduced in Seattle in 1926. Fortunately, the public library officials of the city were anxious to assist the school authorities in establishing the best kind of libraries for the boys and girls of the seventh, eighth and ninth grades. To show the sincerity of the Public Library's wish to cooperate, Judson Jennings, City Librarian, offered to furnish two thousand books to each junior high school for the first year and to set aside each succeeding year a fund equivalent to 75 cents per pupil enrolled in these schools, for the purpose of purchasing additional books. In making this proposition, which was accepted by the Seattle Board of Education, Mr. Jennings stated: "All true education is self-education. *The school library lays the foundation for self-education.* It reaches the child during the formative years; offers an opportunity of developing a discriminating taste in reading; and of fostering a real love of books. Here the non-reading child may be reached. Here may be found the largest number of future citizens. The Seattle Public Library can well afford to extend the same cooperation to the junior high schools that is now being given to the elementary schools."

In selecting a typical Seattle junior high school library to describe in this article, I have chosen the James Monroe Junior High School. The James Monroe School was opened in February, 1931, and has facilities to accommodate an enrolment of 1,350 pupils. William A. King, co-

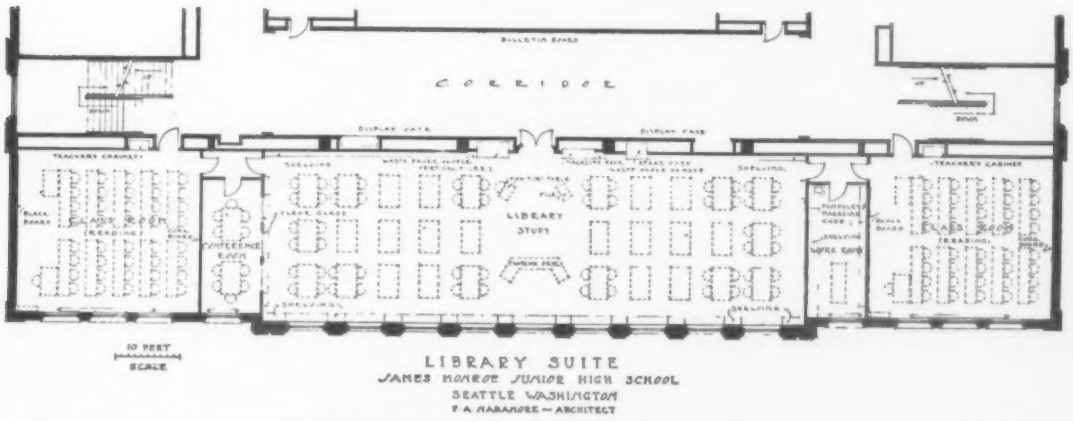
A VIEW OF THE CONFERENCE ROOM FROM THE LIBRARY, AND (BELOW) THE LIBRARY OF THE JAMES MONROE JUNIOR HIGH SCHOOL

Photographs by courtesy of F. A. Naramore, Architect

author of the textbook, "The Teaching and Supervision of Reading," is the principal. Mr. King's personal interest in library work, which was very pronounced when he was principal of the largest platoon school, makes him well fitted to develop the library to its greatest possibilities.

Arrangement and Equipment of the Library Suite

The location of the James Monroe library facilitates its general service to the school. Situated on the second floor of the three-story building, it occupies the center of a suite of rooms extending entirely across the south side of the structure. Taken in order, these are: (1) a reading-literature room, (2) a library conference room, (3) the library, (4) a library work room, (5) a second reading-literature room. On the same floor and just around the corner from one of the reading-literature rooms is the study hall, accommodating 155 students. Through double swinging doors the library opens at the center upon the main corridor. The floor plan and the photographs of the library and of the conference room indicate the relationship of these two features. They also help in visualizing the arrangement of the equipment here tabulated.



PLAN SHOWING THE RELATIONSHIP OF THE ROOMS WHICH MAKE UP THE LIBRARY SUITE IN THE JAMES MONROE JUNIOR HIGH SCHOOL

The library

Shelving, edging of hardwood
30 tables, tops of heavy linoleum, hardwood edging
1 monitor's table
1 library truck
1 charging desk
1 30-drawer 3 x 5-inch card file and base
2 hampers
121 straight chairs, 17 inches high
1 straight chair, 18 inches high
2 stools, 18 inches high
1 stool, 24 inches high
Filing cabinets, recessed in wall, extension guides
1 waste basket

Conference room

1 portable bulletin board
1 portable bookcase
2 tables
10 straight chairs
1 waste basket

The equipment of the librarian's work room, adjoining the library at the opposite end from the conference room, is adapted to the routine work of this department and consists of shelves, cabinets and a table.

An important contribution to the general atmosphere of the library is made by the floors, walls and ceiling. The floor covering is of brown Jaspé linoleum, the walls are a two-toned soft grayed green, and the ceiling is acoustically treated with 1-inch cork board.

The proximity of the reading-literature rooms and the study hall to the library suggests one of the major considerations in the general layout of these units. The reading-literature classes have immediate access to the library without entering the main corridor, and the large study hall cares for ninth-grade study periods. Thus, in addition to serving the needs of these two units, the library affords the necessary capacity to care for numerous individuals and groups from all other departments of the school.

Well-Chosen Materials Enhance the Library's Usefulness

The range and variety of reading materials encourage the fullest possible use of the library. The materials have been selected by children's librarians from the Seattle Public Library and by representatives from the public schools. The James Monroe school librarian explains the basis of choice in these words:

"Our library offers the children books on all subjects which have been written for children of junior high school age. For the most part the books are not technical or highly specialized but of a general type. There is a close balance between fiction and factual material. The books in the non-fiction group have been selected so that many subjects can be correlated. Books of poetry offer the history teacher material which will coincide with various periods of history. The literature teacher finds books from the modern as well as the older poets. Books of travel not only support extensive correlation in the geography classes, but also satisfy the desires of many children for this type of pleasure reading. Biography, civics, and sciences are well represented on the shelves. The fiction books, including many books with historical background, offer a wide range of interest for both boys and girls. Fine editions of the old classics are invaluable in introducing them to the children. A standard list of magazines suited to age and interests adds its part to the wealth of materials."

Typical contacts made through the library are suggested by the following statement: In making illustrated maps, the art teacher depended upon the library for maps as well as for little figures and illustrations to place on them. For studying architecture, the library supplied pictures of the various types as well as materials and descriptions of the buildings. The science department was developing a unit which created a demand for books on animals. While interest was high, a special shelf of animal stories based on scientific facts was provided for their use. In a similar way collections of reference books and other resources have been made available for units of work in social science, music and industrial arts.

In keeping with modern educational practice and the specific aims of the junior high school, the library is organized and administered with the idea of making it a center of the intellectual life of the school.

Some Suggestions on Planning the Stage, Auditorium, and Equipment for a School Theater

By S. R. McCANDLESS, A.I.A., I.E.S.

Assistant Professor of Lighting, Department of Drama, Yale University

As a theater and lighting consultant, I have come to the conclusion that it is not wise to give specific advice on the general problem of planning auditoriums and stages. Solutions vary too much and tabulations are more apt to mislead than to help. The following article deals particularly with the general high school or college theater. It lists some common faults and some suggestions for avoiding them in future buildings. No attempt is made to describe the elaborate provisions necessary for an experimental stage, although experimental work may soon be the purpose for which most school theaters are designed.

This article is based on the fact that a stage adequately equipped for dramatic performances can be used satisfactorily for debates, speakers, recitals, convocations, graduating exercises and the other functions that justify its inclusion as part of the school equipment. One important aspect of school planning, however, cannot be covered in this résumé; it depends upon the decision of each building committee. That is: To what extent will the school auditorium be used for dramatic purposes?

Faults Commonly Found in School Auditoriums Used for Dramatics

1. **Useless apparatus**
2. **Lack of needed equipment**
3. **Too simple equipment**
4. **Inadequate backstage space**
5. **Lack of workroom space**
6. **Inadequate provisions for switchboards and stage equipment**
7. **Hardwood floors instead of pine**
8. **Bad seating arrangements**
9. **Halls too large for dramatics**

Providing for Dramatics in a Modern Curriculum

Dramatic work in schools has developed in spite of the seeming demise of the legitimate theater in all but the larger centers. Academic credit is now being given for what was formerly considered an extra-curricular activity. Many advanced thinkers in the field of education today consider that certain phases of literature and the graphic arts can be taught more effectively through dramatic production than in the classroom.

As dramatic work increases in importance, every large school should be planned to include a small theater in addition to a large auditorium with a speaker's platform. The former should be as thoroughly equipped as any of the science laboratories. The auditorium can then be designed without theater equipment, which can be provided much more completely and economically on a smaller scale.

There are only a few minor suggestions to make regarding the present practice of designing a school auditorium with a rostrum. The rostrum is usually adequate for a speaker but not for dramatics. Yet almost always it is used for dramatics, even though nothing curtails the enthusiasm and saps the energy of participants so much as a limited stage. For this reason I suggest the inclusion of a small theater in the original design of a high school building, or else, if two halls do not seem practical, giving considerably more attention than usual to the layout of the main auditorium.

Better Planned Auditoriums Are Needed

Inasmuch as the latter case will continue to be the more prevalent problem, I should like to point out some of the faults that are constantly being called to my attention, generally after a building has been completed. Keeping the usual financial limitations in mind, it is possible to draw general and specific conclusions which may be constructive in the design of future auditoriums beyond the obvious requirements of good acoustics, ventilation, circulation, and sight lines. It is not the purpose of this article to take up those problems specifically, because they are thoroughly treated elsewhere. I am interested primarily in suggesting a way of making the auditorium a more practical and economical unit in the school plan than it has been hitherto.

The average architect, even if he specializes in school architecture, is not acquainted with the extent of the technical requirements of dramatic production. The director of dramatics is the one person who should be expected to know what should be included in a theater building, yet he usually has so little technical knowledge that his advice is seldom sought in the development of plans. Although the architect can hardly attempt to keep abreast of all the developments of

equipment and methods, the average school board unfortunately expects him to do so. His recourse is to look up a number of recent projects and try to incorporate the elements in his plans. While this is normal practice, until more adequate examples exist the results are bound to include the costly mistakes that already occur too often.

The Most Commonly Found Faults

1. A number of equipment houses provide specifications and engineering service free. While this information is far better than none and very often quite adequate, it obviously tends to be biased. Actually, too few equipment houses know the problems of amateur producing sufficiently to be able to suggest the proper equipment for a school theater. As a result, a great deal of money is wasted on useless apparatus, and nobody in particular is responsible. It is often cheaper to seek the services of an expert than to follow this procedure.

2. The method of budgeting stage equipment, not only on the meager side, but with the idea that it can take the first cut in building costs, leaves the stage as useless as a motor car without an engine. It would be far more economical to rule out dramatic work in the beginning and thus eliminate the cost of the inevitable "footlights, border lights and switchboards," than to provide them arbitrarily and inadequately.

3. In most schools the stage equipment selected is chosen with a view to its being safely handled by inexperienced persons—in short, foolproof. If laboratory equipment were chosen on the same basis, there would be no experimental or research work beyond the most primitive. With a little instruction, students are as able to understand the operations and hazards involved in the use of stage equipment as are the average stage hands. In fact, in most cases it is possible to count on the safe operation of even more complicated material than is usually thought advisable for use in the average theater. This is particularly true of switchboards.

4. One of the most flagrant mistakes made in planning auditoriums is the inadequate allotment of backstage space. Even a summary glance at the poorest professional theater will reveal how necessary are depth, width and height. Nothing betrays the fact that an architect is either absolutely ignorant or wilfully disregardful of the demands of dramatic production so much as the niche shape that is given to the average school stage. Solid walls sloping back from the proscenium line preclude making entrance at any but prescribed places. Shallow depth, which may be in scale with requirements for an occasional speaker or recital group, allows very little freedom of movement or illusion of space in a stage picture. The usual low ceiling of concrete or plaster prevents flying any scenery, and in some cases forces the use of outmoded rolling curtains. The great fore-stage or apron that often accompanies this type of platform removes actors so far from the audience that even the best professional could hardly project across such a barrier.

5. If there are to be any classes in directing, scene designing, scene building, lighting or costuming, some place should be provided for each type of work. It is a common mistake to think that all this can be done on the stage. If the schedule is at all full, nothing can be thoroughly started before it must be removed to make place for something else. It is as important to have definite places for the work of dramatic classes as it is to provide manual training shops and physics laboratories.

6. Provisions for lighting equipment switchboards and general stage equipment such as stage braces, rolling platforms and the like, are almost always inadequate. Outlets about the stage are limited in number. Switchboards are equipped with only a few dimmers, generally permanently connected to useless border lights and often controlled by noisy snap switches. Several rows of border lights are practically never needed.

7. Almost invariably architects specify hardwood floors for the stage, making the use of stage screws impossible. A good pine floor with a properly padded, removable covering is in all respects more satisfactory.

8. If an auditorium floor must be flat (as it must be if it is used as a gymnasium), the obvious means of obtaining good vision for those seated in the rear is to raise the level of the stage. In some instances architects have even resorted to sloping the stage floor, which is decidedly impractical. A more satisfactory way to meet the problem is by the use of portable chairs or banks of seats, mounting the rear seats on portable platforms. Generally speaking, a stage should not be higher than three feet above the level of the auditorium.

In regard to the arrangement of the seats, whether the main floor is flat or not, the line drawn along the side of the bank of seats from front to back should never be greater than 30 degrees from the main axis of the auditorium. Banks of seats on each side as provided by the horseshoe-shaped balcony should be used only as a last resort. It is uneconomical to plan an auditorium with seats that face the stage from the side. They are uncomfortable for those who have to use them, and are almost always vacant. A fan-shaped seating arrangement is not only more comfortable, but a far more practical use of space.

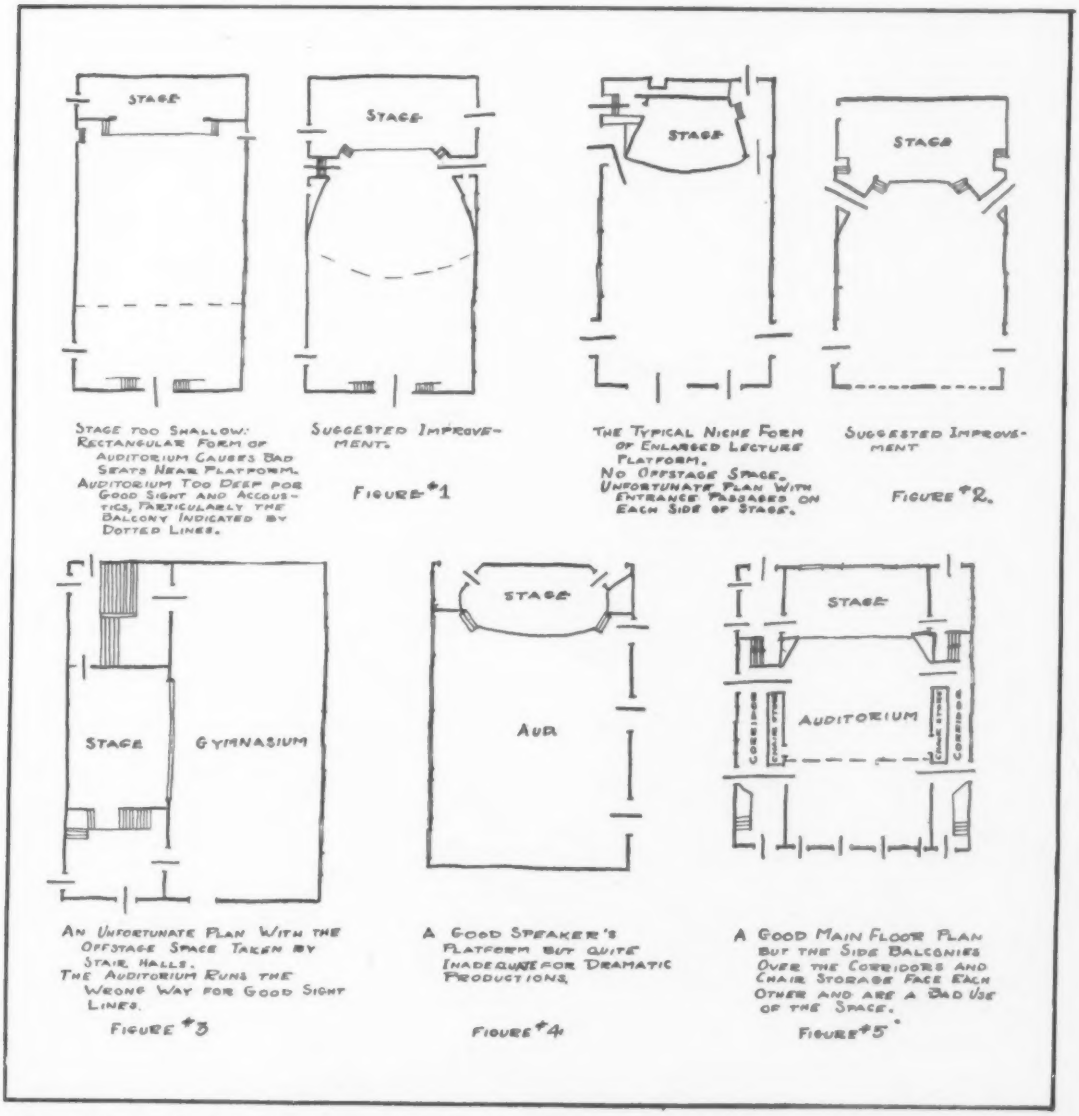
9. The space requirement of a large number of seats presents a problem that generally limits the value of the auditorium for dramatic purposes. Auditoriums seating over 1,000 are almost always out of scale with the demands of the average dramatic production, no matter how large the enrolment of the school. The methods of shutting off part of a large auditorium so that a small

audience may not feel lost have not been very successful up to the present. One experiment, now in the plan stage, will be watched with interest. An auditorium which normally will seat 2,500 is to be provided with a large curtain that can be drawn across the face of the balcony. The curtain will block off 1,200 seats in the balcony and 500 at the rear of the main floor. Inasmuch as the device has not yet been tried out, its effectiveness cannot be estimated. In general, it is better for a small auditorium to have the seats all on one floor, with the slope of the floor approaching a 3-inch rise between each two rows of seats. The rows should be 33 inches to 36 inches apart.

Suggestions for Making an Auditorium Useful for Dramatics

In planning a high school auditorium, special attention should be given to the following factors, each of which will affect its success and usefulness as a school theater:

1. Area of stage
2. Width and height of proscenium
3. Depth, width and height of stage and backstage space
4. Stage curtains
5. Scenery
6. Stage background
7. Method of hanging scenery


STAGE
STAGE TOO SHALLOW. RECTANGULAR FORM OF AUDITORIUM CAUSES BAD SEATS NEAR PLATFORM. AUDITORIUM TOO DEEP FOR GOOD SIGHT AND ACCOUSTICS, PARTICULARLY THE BALCONY INDICATED BY DOTTED LINES.
STAGE
SUGGESTED IMPROVEMENT.
FIGURE #1
STAGE
THE TYPICAL NICHE FORM OF ENLARGED LECTURE PLATFORM. NO OFFSTAGE SPACE. UNFORTUNATE PLAN WITH ENTRANCE PASSAGES ON EACH SIDE OF STAGE.
STAGE
SUGGESTED IMPROVEMENT
FIGURE #2.
STAGE
GYMNASIUM
AN UNFORTUNATE PLAN WITH THE OFFSTAGE SPACE TAKEN BY STAIR HALLS. THE AUDITORIUM RUNS THE WRONG WAY FOR GOOD SIGHT LINES.
FIGURE #3
STAGE
AUD.
A GOOD SPEAKER'S PLATFORM BUT QUITE INADEQUATE FOR DRAMATIC PRODUCTIONS.
FIGURE #4
STAGE
AUDITORIUM
CORRIDOR
CORRIDOR
A GOOD MAIN FLOOR PLAN BUT THE SIDE BALCONIES OVER THE CORRIDORS AND CHAIR STORAGE FACE EACH OTHER AND ARE A BAD USE OF THE SPACE.
FIGURE #5

SKETCHES OF SCHOOL AUDITORIUMS SHOWING FREQUENTLY FOUND FAULTS OF CONSTRUCTION AND SUGGESTED IMPROVEMENTS

8. Lighting system
9. Structural requirements for flexible lighting
10. Signal system
11. Construction of stage floor
12. Stage floor covering

1. The stage of a small auditorium should equal the auditorium in area; in a large auditorium the stage may be one-quarter the area. In many professional theaters, particularly those in Europe, the stage space is often considerably larger than the auditorium. Revolving stages, wagon stages and elevators are practical only on thoroughly equipped, much-used stages.

2. The proscenium should be at least one-half to three-quarters the width of the auditorium. Its height should be pleasing, not unduly high nor ridiculously low, as very often happens.

3. The depth of a small stage should be at least as great as the proscenium opening is wide. With some large prosceniums the depth might come down to one-half the width. The overall width of the stage should theoretically be three times that of the proscenium opening, but this is generally not practical. At least half the width of the proscenium on each side of the stage should be allowed for storing scenery and moving properties. Provision may also be made for storing scenery outside the building. As suggested under 5 above, space should be set aside for the work of classes in scene designing, scene building, etc.

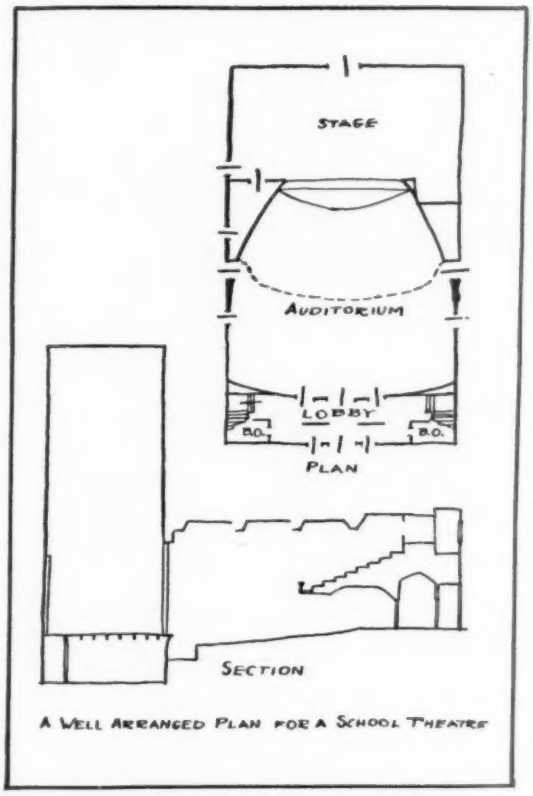
Dressing rooms need not open immediately onto the stage. As a matter of fact, it is often more desirable to have them at some distance in order to avoid noise and commotion.

The height of the stage house, if there can be any height provided, should be at least twice the height of the proscenium, and preferably three times. Some of our newer opera stages are almost four times the height of the proscenium.

4. The proscenium should be equipped with an asbestos or fire curtain if the auditorium seats over 300; under special conditions, this can be eliminated with the permission of the fire department. Directly behind the fire curtain, the act curtain may be hung from a track to permit drawing, or provided with adequate space above to permit flying. Behind this should be a set of side curtains, called tormentors, which should be adjustable in order to close in the width of the proscenium opening; above it there should be a cloth border, called a teaser, also adjustable, to close down the height. The use of an elaborately painted or draped valance hung from the proscenium in front of the act curtain is unnecessary with a properly designed opening.

The orchestra pit can be filled in with portable platforms or built as an elevator to provide an apron or curving fore-stage when desired.

5. Scenery always presents a great problem and it is never satisfactorily solved by the use of curtains. Unless some plan is made for the construction and use of scenery, a draped gray or black cotton velour cyclorama and side wings, including borders, should be provided. If the seams are sewed vertically, they can be ripped up and openings made for doors and windows. A so-called "unit set" has certain advantages but is seldom as effective as a permanent architectural or formal setting.



SKETCHES OF THE FLOOR PLAN AND CROSS-SECTION OF A WELL-PLANNED SCHOOL THEATRE

6. One of the most important pieces of scenery is the background, which may be either a plastered back wall, a solid curved cyclorama, fixed or of the flying type, a stretched-cloth cyclorama, or a dome. With the proper background masking the back and side walls of the stage from all points in the auditorium, it is possible to do away with a great deal of scenery. The lighting equipment, however, should be elaborated to allow for proper illumination. A dome which is built in the form of a quarter-sphere is apt to create acoustic problems and limit the flexibility of moving scenery on and off the stage, but it is very valuable if the headroom over the stage is limited.

7. Some method of hanging scenery should be provided, preferably a standard counterweight system. From 10 to 60 sets of lines can be considered. For the average-scale stage, depending upon its depth, there should be at least one set

of lines for every foot of stage depth. The space close to the proscenium is the most valuable for hanging scenery and should have the lines grouped as closely as possible, allowing greater spaces toward the rear.

A modern school theater should be equipped for motion pictures. The booth should be either at the rear of the auditorium, at not too high a level, or at the rear of the stage if a "Translux" or similar type of apparatus is used. The picture booths should have a sound attachment.

8. An adequate installation of lighting for the house and stage is one of the primary features of a modern theater. I can recommend only one or two references which suggest the kind of layout which is likely to be adequate, and unfortunately these have been written primarily for the little theater. The specifications listed in equipment catalogs are, in all except one or two cases, based on the demands of large presentation houses, and are over-elaborate and inflexible for lighting the average dramatic performance. The number and kind of each type of stage lighting equipment should be specified separately in order to provide flexibility for an individual theater. Strictly speaking, there is no such thing as a standard layout. The same is true of a switchboard. With a little careful planning it is possible to assemble, and at less cost, a board that is many times more serviceable for school needs than most switchboard companies recommend.

9. A number of structural features must be considered to allow for flexible lighting. One of the most important requirements is an opening in the ceiling, or a space high up on the side walls, for mounting lens hoods to illuminate the front of the stage. In theory, the angle of the throw should be along the diagonal of the cube, as this angle provides more plastic effects than with the old type of border and foot lighting. Under some conditions the instruments can be mounted in the face of the balcony, but the angle is so flat that it causes bad shadows on the background.

In theaters where considerable emphasis is to be put on lighting, a bridge as wide as the proscenium should be mounted directly back of the act curtain or inner proscenium. This will enable operators to change gelatins and to focus spotlights between scenes.

Some people advocate the elimination of footlights. They can, however, be very useful at times. The disappearing type that provides a continuous line of light—not built in widely separated sections—can be used very satisfactorily to tone the setting and to illuminate the shadows on the actor's face.

Other outlets for light instruments should be disposed about the floor of the stage, on pipe battens over the stage or on the gridiron, and at the tormentors. The number needed depends upon the degree of flexibility desired.

10. A signal system connecting the stage manager with the various groups of people concerned with the running of a performance is necessary unless the stage is small.

11. There is a great deal of question regarding the value of traps in the stage floor. Unless traps are readily movable or are built into large sectional elevators, they should be eliminated and the stage floor should be so constructed underneath that a trap can be cut whenever necessary.

12. The general acting area of a stage should be covered with well-padded canvas or linoleum.

Auditoriums can contribute greatly to the enrichment of school life. But they need to be carefully designed, with close attention to the needs of the groups concerned. They are extravagant and uneconomical if they are not planned for the utmost possible use.

References on the Planning and Equipment of School Theaters

The following list of books will give the reader some direct sources of information. I have included here only the books which are practical. A few permit further study of the problem. A list of manufacturers can be found in the appendixes of several of the books indicated below.

Lighting the Amateur Stage—A Practical Layout.—By Henning Nelms. Theatre Arts, Inc., New York. Line drawings. $1.00.

An excellent résumé of lighting equipment and general layout for the little theater. The switchboard recommendation is only one of several equally good solutions. A list of equipment houses.

Lighting for the Non-Professional Stage Production.—By A. L. Powell and A. Rogers. Krieger Publications, New York. Illustrated. $1.50.

The second section gives a good résumé of equipment for the little theaters. The last section outlines budget allowances for different sizes of theaters. A list of various equipment houses.

Stage Scenery and Lighting.—By Samuel Selden and Hunton D. Sellman. Crofts, New York. Illustrated. $3.50.

A good elementary text on the design and construction of scenery, and elements of stage lighting. A complete list of references.

Stage Lighting.—By Theodore Fuchs. Little, Brown and Co., Boston, Mass. Illustrated. $10.00.

A most complete survey of stage lighting. Chapters VI and VIII cover equipment and control in an exhaustive manner. Complete list of references.

A Syllabus of Stage Lighting.—By S. R. McCandless. Whitlock's Book Store, New Haven, Conn. A mimeographed outline. $6.00.

A complete text on the theory, equipment and methods of stage lighting. The second part covers the principles governing the design of equipment and layouts.

The Scene Technician's Hand Book.—By Philip Barber. Whitlock's Bookstore, New Haven, Conn. Mimeographed and illustrated. $5.00.

The most detailed handbook on the construction of scenery and the elements of the stage that is available.

Buehnentechnik der Gegenwart.—By Friedrich Kranich. Verlag von R. Oldenbourg. Berlin and Munich, Germany. Illustrated.

An elaborate survey of the technical apparatus of the stages in Germany. Valuable for studying the variety and extent of stage machinery considered practical in Europe.

There are many other helpful books and pamphlets. Among them are catalogs of the various companies, but there are very few more than are mentioned above published on school theaters that can be recommended.

Provisions for Musical Activities in New High Schools

By NORVAL L. CHURCH

Assistant Professor of Music Education, Teachers College, Columbia University

THERE was a time when music in high schools was more or less an extra item, to be placed in any room available, regardless of the inconvenience it caused the music department or the other departments of the school. But now that the importance of music is well known, we are beginning to realize the importance of making adequate provisions for the music department when a new building is being planned.

The results of a recent questionnaire show that the problem has been given some thought during the past few years and that high school music departments are far better housed than they ever were before. The questionnaire also revealed, however, that music departments have in most cases already outgrown their quarters, with the result that working conditions for music are again unsatisfactory.

The first need, then, in the planning of special rooms for high schools is vision. It is much wiser to plan for the future—and by this I mean at least a few years in the future—than it is simply to meet present demands. It is a matter of economy to see that, during the construction of a building, provision is made for all school activities which are assured for a considerable number of years. A well-designed high school will include the following for its music department:

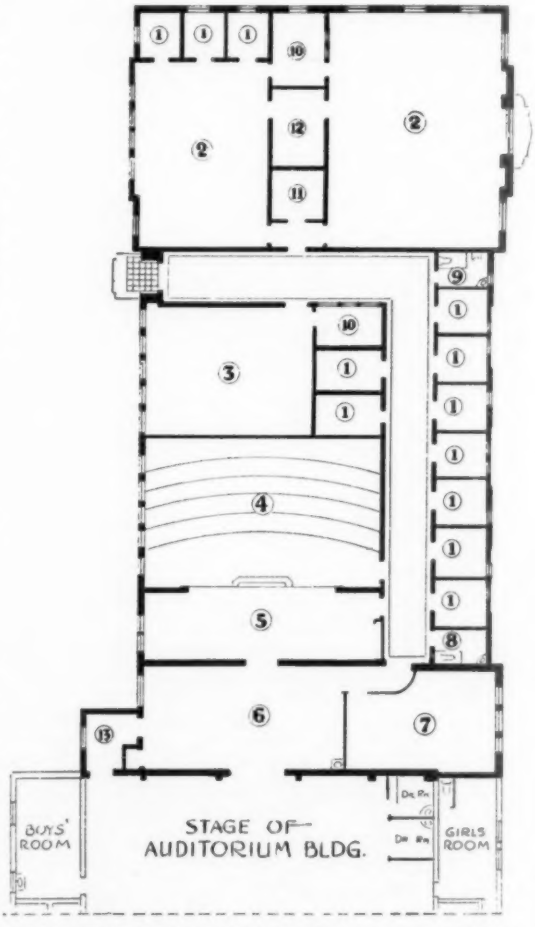
(a) A rehearsal room
(b) A general music room
(c) An instrument room
(d) Individual practice rooms

These should be of sufficient size to meet adequately all the demands which are likely to be placed upon them.

Location

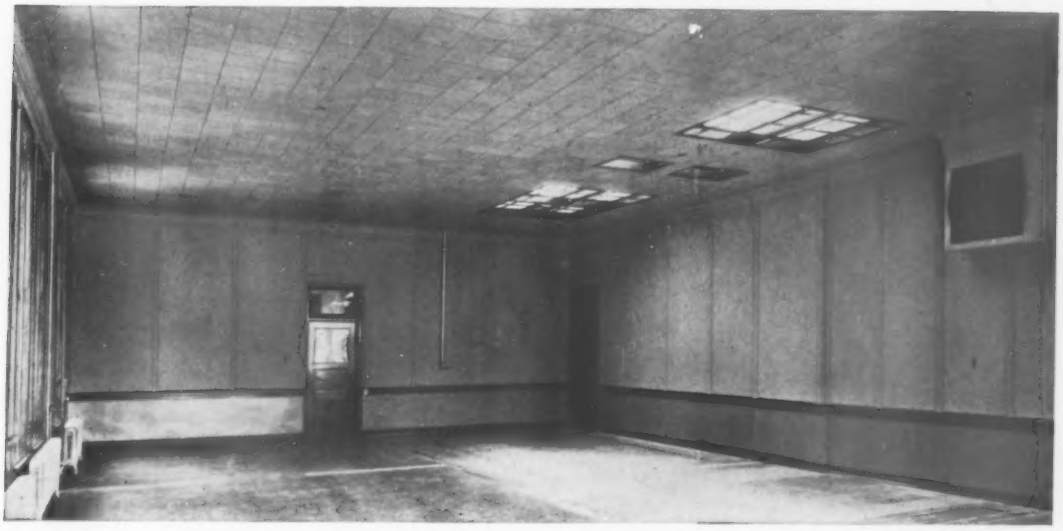
The proper location of these rooms within the building is extremely important. Located too near study groups or on the ground floor where practicing is likely to annoy other people, they are very objectionable. Music activities have often suffered curtailment because of unwise room assignment. It is therefore recommended that the music department be located in an isolated wing of the building and on an upper floor. Properly soundproofed, music rooms so placed will not cause disturbance to the rest of the school.

Another point to be considered is accessibility to the part of the building to be served most frequently. Music organizations contribute greatly to the forwarding of the general school life. Since they do this largely through the medium of the high school assembly, the music department should be near the auditorium. Few people who have not handled large instrumental organizations realize the difficulties involved in planning for such a simple function as an assembly program. The complications created by the necessity of assembling stands, chairs, and large instruments such as tympani, string basses and cellos are increased when any or all of them must be transported from a distance. An architectural plan which provides for these problems and places the



THE WELL-PLANNED MUSIC UNIT IN THE SEQUOIA UNION HIGH SCHOOL, REDWOOD CITY, CALIF.

Key to floor plan: 1, practice rooms; 2, orchestra rooms; 3, classroom; 4, choral room; 5, stage; 6, scenery room; 7, stage-crafts room; 8, girls' toilet; 9, boys' toilet; 10, offices; 11, uniform room; 12, storeroom; 13, property room.



AN ORDINARY CLASSROOM, OR, AS IN THIS DENVER SCHOOL, AN UNUSED SHOP ROOM, CAN BE CONVERTED INTO A MUSIC ROOM BY THE APPLICATION OF SOUNDPROOFING MATERIALS ON THE WALLS AND CEILING

instrumental rehearsal room very near the stage will be of great help to the success of the music program.

Soundproofing

As indicated above, if the music department and other departments of the high school are to get along smoothly together, attention must be paid to more than location in order to eliminate disturbing noise. The modern music room must receive scientific soundproofing. Numerous attempts at soundproofing in the past have been practically worthless. Since the development of radio and sound pictures, however, knowledge of soundproofing has become available, so that no architect ought to fail in this regard.

Acoustics

Another great difficulty which music departments have always had to face is poor acoustics. It is not fair to the child who enjoys music and who should be able to hear it and play it at its best to be forced to play in a room where bad echoes are present and where it is next to impossible to hear accurately. Certainly it is impossible to develop sensitive ears capable of making fine distinctions in music in the ordinary room provided for ensemble work.

Like soundproofing, the subject of acoustics has been given very thorough treatment because of modern developments in the field of sound, and there is no excuse for bad hearing conditions in a music room designed today. Several different methods of acoustical treatment are available, but it is not the purpose of this article to go into detail concerning them. Any reliable architect can get all the information that is needed on the subject.

Lighting

The question of artificial lighting is an important one in designing an ideal music room, because of the demands made by vocal and instrumental ensembles. The player or the singer must be able to read his music easily, and at the same time be able to see the movements of the conductor. Experience shows that the best type of lighting for music rooms is the indirect method. This eliminates uneven distribution resulting in glare in the eyes of some performers and lack of light for others.

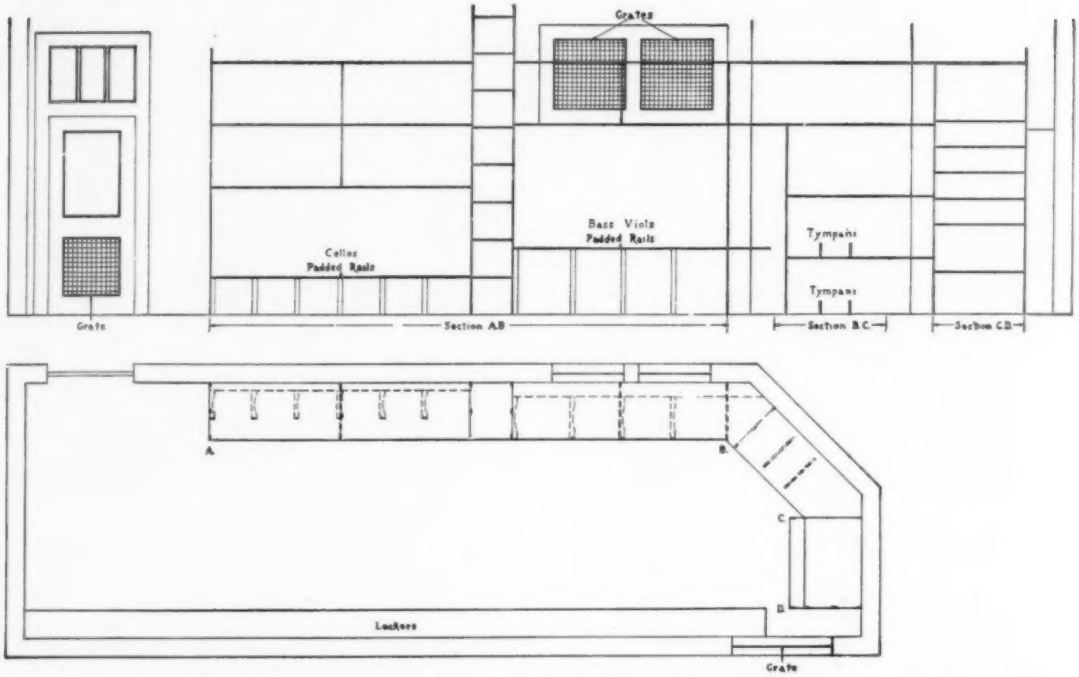
Ventilation

The question of ventilation in the usually fairly well-crowded music room is important. The temperature of the room ought not to be over 68° F.* This provides not only for the comfort of the players and singers but also for the pitch of the instruments. A room which is constantly changing in temperature is undesirable, for the reason that instruments vary noticeably with temperature changes, and unfortunately they do not change in the same ratio. The problem of course deals quite as much with the matter of heating as with ventilation, but the problem of heating is so well known that no mention of it need be made here.

The Rehearsal Room

Size.—Every high school should be provided with a rehearsal room for the band, orchestra and other large ensembles. The room must be large enough to provide not only for the present or-

* Valuable information on the subject of ventilation may be obtained from the New York Commission on Ventilation, 49 Wall Street, New York.



THE PLAN OF THE STORAGE ROOM FOR MUSICAL INSTRUMENTS IN THE PUBLIC HIGH SCHOOL, ATLANTIC CITY, N. J.

chestra but for an orchestra which might later be developed. For instance, a high school of from 700 to 1,000 enrolment should make plans for a rehearsal room which would accommodate 75 to 100 players. A high school of more than 1,000 should provide for a rehearsal room of from 100 to 125 players. If generous provision is made, it will always be possible by special seating to accommodate more players. It is difficult to give the exact number of square feet necessary for orchestras of various sizes, because of the amount of floor space which cannot be used. A violin player can get along comfortably with 12 square feet of floor space. The cello player will require about 14, the string bass approximately 18, while the tympani players should have 36 square feet.

A rehearsal room should not be too long for its depth. If it is, there is a considerable amount of space at each end which cannot be utilized. For instance, a strip about 4 feet wide running the length of the room is usually allowed for aisle and conductor space. It is not necessary to include this entire amount when figuring for stage or orchestra pit. It is probably safe to say that one should allow 20 square feet per player on an average. This would mean that, in order to accommodate an orchestra of 100 players, the room should contain about 2,000 square feet. The amount would depend on the shape as well as the acoustics of the room.

Chairs.—The rehearsal room should be provided with movable chairs of good quality and not the folding type. They must of course not have arms, because of the demands made upon the players by the instruments. The number of chairs will vary in each situation according to the size of the organizations using the room. For psychological reasons it is never advisable to have a great number of vacant chairs in the rehearsal room.

Music Stands.—There should be an adequate number of music stands of a very substantial quality, usually with iron bases and wood or metal tops. The metal-topped stand is to be preferred in most cases because of its durability. The stands must be adjustable as to both height and angle. An orchestra of 100 players would need approximately 50 stands.

Conductor's Platform.—A conductor's platform should always be provided in the rehearsal room and should be part of the architect's plan. It should match the room and be approximately 4 feet square and about 6 to 8 inches high. The platform should not be a built-in feature, but should be movable, to permit any adjustment which the conductor may wish to make.

Blackboard.—Most conductors find it desirable to have a blackboard in the rehearsal room. This can be built in as permanent equipment or it can be movable. There are two objections to having the blackboard built into the wall:

1. It gives the room too much the appearance of an ordinary classroom.

2. It may not be in the proper place for various sizes of ensembles which may use the room.

The movable blackboard will probably best serve the purpose and will not detract seriously from the beauty of the room.

Music Cabinets.—Cabinets for the proper cataloging of band, orchestra and choral material should always be provided. Whether they should be kept in the rehearsal room or not depends on the plan of the building. If the supervisor of music has an office just off the rehearsal room, the latter will be an excellent place for all the music cabinets. While it is important to have the music located near the rehearsal room, it is also important to have it in a place where it will be well protected, and sometimes the rehearsal room is too public.

Phonograph and Radio.—The modern high school band and orchestra as well as the chorus are finding new uses for the phonograph in connection with their regular rehearsals. A symphony about to be played by the orchestra will be much better understood if wise use is made of a good phonograph record. It is therefore well to have in the rehearsal room a phonograph of the latest design and best quality. The radio may more properly be a part of the regular classroom, since it will be of use there on more occasions.

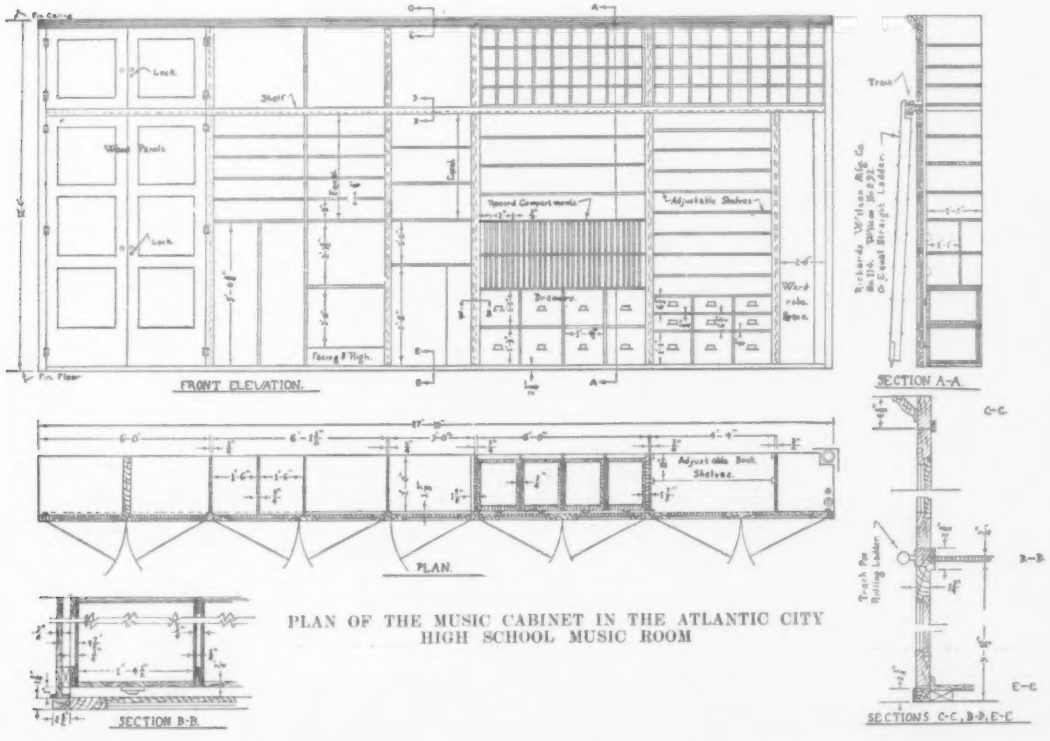
Certainly a radio must be available for all the students studying music, and if the rehearsal room is the only large room in which it may be heard, a radio should be included as part of the equipment.

General Music Room

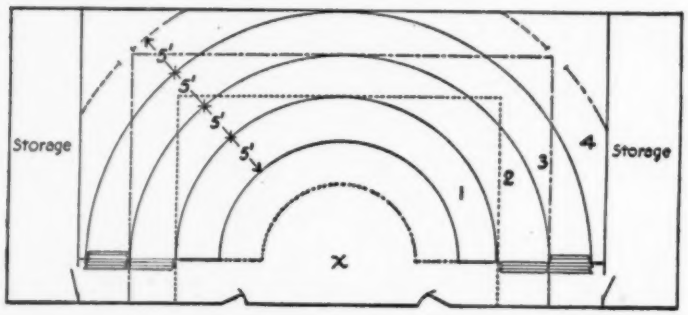
The general music room will be devoted to such music activities as the chorus, classes in appreciation, theory, etc. It should be approximately half the size of the rehearsal room and located near it, possibly separated only by the instrument room and the music director's office. It should receive the same consideration with regard to soundproofing, acoustics and lighting as has been recommended for the rehearsal room. The equipment should include a staff-lined blackboard, and movable chairs with arms which may be raised or lowered. The room should also have a fine phonograph and an up-to-date set of phonograph records adapted to various phases of music activity. The radio is a very necessary part of the general music room and should be of a design which will insure the best tone quality. Some teachers find a platform large enough to accommodate solo and chamber performers a valuable addition.

Instrument Room

A properly designed and equipped instrument room is essential for a modern high school. Any well-developed music program will have a fine band and orchestra, which of course means that a great number of the larger and rarer instruments must be owned by the school. These instruments represent a big expenditure of money; economy demands that they be properly provided



PLAN OF THE MUSIC CABINET IN THE ATLANTIC CITY HIGH SCHOOL MUSIC ROOM



FLOOR PLAN OF A REHEARSAL ROOM FOR INSTRUMENTAL AND VOCAL GROUPS, USED IN PITTSBURGH, PA., SCHOOLS

This plan may be adapted to smaller rooms, as indicated by the straight dotted lines. Arcs are drawn from point *x*, selected as the best location for the conductor. Risers are approximately 8 inches high. Opera chairs are placed on treads 1, 2, 3 and 4.

for. Many schools find it best to build a separate cabinet for each instrument. This of course insures the maximum amount of protection for the instruments. It is not always necessary, however, to build cabinets for instruments such as the cello and string bass. They may be suspended a short distance from the floor on wooden pegs without any cabinet to surround them. The question of temperature and ventilation is important, and with these instruments special care should be taken that they are not overheated at any time. It is advisable to keep the temperature as uniform as possible and not allow the air to become too dry.

The size of the instrument room will vary with the size of the high school and the number of instruments it owns. The entrance to the room should provide for a system of checking instruments which will prevent individual students from entering the portion of the room where the instruments are actually kept. No part of the instrumental program needs more systematic attention than the checking in and out of school instruments.

Practice Rooms

The modern high school, in order to meet the needs of its students, must provide as many practice rooms as possible. They should be constructed along the lines suggested for the rehearsal and the general music room. A practice room should be about 12 by 15 feet, and should be provided with a piano for practice purposes. In addition to piano practice, the rooms may be used for:

1. Individual voice or instrument practice
2. Chamber music ensemble
3. Class instruction in small groups

A really fine high school should have ten of these practice rooms, located as near as possible to the instrument room.

Auditorium

The auditorium is a standard requirement in all high schools today and needs but little mention here. It must of course be of sufficient size to accommodate the student body, and be so constructed as to be acoustically perfect.

Stage.—The stage must be large enough to accommodate as large an orchestra as is provided for in the rehearsal room. A great many high schools have the gymnasium directly in back of the stage, thus providing adequate floor space for any occasion. The only difficult feature of this is the conflicts which occur between the music organization and the physical education classes.

Similar conflicts with the dramatic and other departments are likely to occur if the general music room is placed directly in back of the stage, as it has been in some cases so that the stage can be used for a rehearsal room. A plan of this kind of course saves money and, from the standpoint of the music program, has many things in its favor. It certainly makes a very compact arrangement and permits the organizations to rehearse in the place where they are later to appear. This not only is to be recommended but is necessary for fine performance. It is not necessary, however, to do all the rehearsing on the auditorium stage, and the objections to the joint use of the stage often seem to outweigh the advantages.

Orchestra Pit.—Frequently a high school wishes to put on a program of chorus and orchestra or of operettas calling for a full orchestra. This means that the orchestra pit must be much larger than is ordinarily found. The orchestra pit should provide for an orchestra of approximately 75 players.

Organ.—The organ is more and more becoming standard equipment for the up-to-date high school. A word of caution might be inserted here that only an organ of fine quality be installed. It is much better to have no organ at all than to have one of the cheap theater-type organs that have been installed in some recent school buildings.

No subject in the present-day high school curriculum can do more for the general development of the school than can music. It is therefore important that adequate provisions be made for this department, so that it may serve rather than annoy other departments and at the same time fully realize the possibilities inherent in the field of high school music.

Equipment Needed for a High School Commercial Department

By FREDERICK G. NICHOLS

Associate Professor of Education, Graduate School of Education, Harvard University

THE time never was more propitious for discussion of the equipment needs of a high school commercial department. At no time should public funds be wasted; but in times of unprecedented economic distress it is peculiarly fitting that costs of education be scrutinized with unusual care. Unnecessary equipment should be eliminated. No new equipment should be purchased unless it is unquestionably essential to efficiency in giving sound business training. On the other hand, no equipment should be scrapped and no new equipment essential to the effective teaching of worthwhile business subjects should be withheld except as a last resort, even in times such as these when school budgets and expenditures must be balanced without unduly increasing tax burdens. It is not possible within the limits of this short statement to deal fully with all the major considerations which should be given due weight in determining kinds and quantity of equipment needed for a typical high school commercial department. It should be profitable, however, to consider briefly some of the aspects of the subject which seem to be of primary importance.

The nature of the training to be given determines the kind and quantity of equipment needed. In preparing this statement the following things have been assumed:

1. That every high school commercial curriculum should include (a) background general education, (b) social-business subjects for the development of vocational intelligence and economic understanding, and (c) subjects which produce a single major skill or a closely related group of skills.

2. That each commercial graduate will have a good high-school education, civic intelligence, vocational understanding, and occupational competency.

3. That the four skills best calculated to insure initial employment with promise of advancement are clerical, stenographic, bookkeeping, and retail salesmanship.

4. That if these skills are to be developed, essential equipment must be available for teaching and practice.

The equipment discussed will have to do with the development of these skills. It is assumed that little, if any, special equipment will be needed for the academic and social-business parts of the program.

Courtesy of the Monroe Calculating Co., Inc.

A CLASS IN MECHANICAL BOOKKEEPING IN THE HIGH SCHOOL OF COMMERCE, SAN FRANCISCO, CALIF.

Unspecialized Equipment for Commercial Classrooms

To avoid duplication, a brief statement is made here about equipment which is common to all commercial classrooms regardless of subject taught.

Filing and Storage Cabinets.—In courses which involve much written work, all work turned in should be kept until these courses are completed. Ample filing space should therefore be provided; also space for the storage of instruction materials. Wall cabinets, sectional 3-, 9-, and 15-drawer cabinets, and vertical filing sections, are useful for this purpose. If there is a clerical department in which filing is taught, all class material to be filed may be transferred to this department and be used in practice filing. This eliminates the need for files in the various commercial rooms.

Bulletin Boards.—A bulletin board of generous size is needed for use in posting specimens of good work, illustrative material, notices and lesson assignments. "Homemade" boards may be used.

Card Files.—There should be a card file in each room used regularly for classes in skill subjects, for the purpose of keeping a record of all permanent equipment and materials. Desk-drawer card trays will do. On a card for each machine used, a record of all expense for its repair should be kept. When the cost of upkeep of any piece of equipment reaches the point where it is more economical to trade it in for a new one, an exchange should be effected. The actual history of each item—cost, expense of upkeep, duration of service, use received, and trade-in value—will aid materially in keeping up the quality of service obtained from equipment and keeping down its cost.

Bookcase.—In every room there should be book space—built-in or sectional—for reference books and collateral texts.

Progress Charts.—A progress chart similar to the one suggested later for typewriting rooms may be useful in other rooms where many projects are included in the instruction plan. Such a device is more stimulative than state or other contests.

Dictionary.—A good dictionary is needed in each commercial room.

Teacher's Desk.—A desk of the "efficiency" variety should be included. It has card trays and vertical filing equipment in deep drawers, and a compartment for supplies, etc. This type of desk costs a little more than ordinary desks, but is worth the extra cost as an aid to instruction. It obviates the need for additional card record cabinets for the teacher's use.

Blackboard.—Ample blackboard space, properly ruled for shorthand, bookkeeping, etc., should be provided. Permanent ruling saves much of the teacher's time and adds to the clarity of the illustrations shown.

Specialized Equipment

It should be noted that all of the office-training equipment needed for stenographic and bookkeeping pupils, and much of that required for typing pupils, naturally forms a part of the equipment of the clerical department and will be discussed in connection with that subject.

Typewriting

Typewriters.—In the past, very little equipment was needed in the commercial department. Until recently, labor-saving machines have been but little used. School officials rarely question the periodical need for new typewriters and order them freely as requisitioned. As long as the typewriter plays an important part in office work, so long will schools that train for such work be compelled to provide machines for the use of their pupils.

Number of Typewriters.—The number of typewriters should be adequate, but not excessive. They are cheaper than teachers. In large schools, too small classes should be avoided. Frequently a teacher can be saved by having groups large enough to permit the inclusion of all necessary typewriting classes in the schedule of a single teacher. Too often "dead" typewriters increase the cost of equipment. This is caused by the expensive and usually inexcusable practice of scheduling other classes in typewriting rooms, such as, for example, alternating junior business training with typewriting in the same room, or giving shorthand dictation in a transcription room. Typewriting can be taught only in a room equipped with machines. Shorthand, junior business training, bookkeeping and most other traditional commercial subjects can be taught in any room. The typewriting room should be reserved for this subject, and all machines should be kept in use every period of the day.

Kinds of Typewriters.—A local survey of kinds of typewriters in use may be necessary. But it must be remembered that after a pupil has mastered one standard-keyboard machine, it is comparatively easy to acquire reasonable skill in the operation of any other similar machine. It is not necessary to have a full complement of machines of all important makes. No beginning typewriting room should contain more than one kind of machine. An advanced typewriting room, or an office practice room, or a transcription room, may, and probably should, contain all the more important makes which are not represented in the beginning room. If there are several of these rooms, each may be fully equipped with a single kind of machine. Before the typing course is completed, each pupil should be required to become familiar with each make of machine in general use.

Typewriter Desks.—Expensive desks are unnecessary. Drop-leaf desks, for example, cost too

much and are otherwise wasteful for beginning pupils. They occupy too much valuable space and offer a constant temptation to use the room for subjects other than typewriting, thus increasing the number of machines required. They contain drawers which, unless locked, offer constant temptation to pupils to "borrow" from others. Handling any system of keys for individual desks is wasteful of the teacher's time and productive of much delay and discord in the classroom. For beginning classes, a small substantial table is most satisfactory from the standpoint of cost, room economy, and convenience in teaching. Rigidity can be obtained by using floor angle-irons.

In the room used for transcription, stenographic practice or advanced typing work, a small commercial desk may be used to advantage. Classes in this room are smaller and the amount of collateral material much larger. More working space is needed. Even these desks should not be too expensive. Each one should contain a drawer for the text and for simple tools which accompany each machine.

Typewriter Chairs.—An adjustable chair is essential. Proper relationship between body and machine is essential to efficiency, health and comfort. By care in assigning pupils to machines, the teacher may insure the minimum of chair adjustment at the beginning of each class period. One row may be reserved for short pupils, another for tall pupils, and the other rows for pupils of medium height.

Timing Device.—It would be better if stop watches were barred from typewriting and shorthand classrooms. They are useful only in timing short dictations and typing drills. Such emphasis on spurt speed is harmful. Careful timing of longer periods of production puts the emphasis where it belongs—on ability to maintain normal speed in work which involves a variety of mental and physical activities over a reasonably long period of time. A time-stamp-clock for use in recording the exact moment of beginning and completing assigned tasks is much more valuable than the stop watch.

Progress Chart.—A device for indicating individual pupil progress should be used. Each pupil should know every day where he stands with respect to the schedule posted by the teacher and in relation to every other pupil in his class. A diagram like that below has been found useful.

Such a chart shows when each lesson, exercise, budget, or other unit is due. By recording the date when finished, the pupil is shown just where he stands. By using red ink in recording delinquent work, the fact of such delinquency is known to all. This affords an incentive to keep up with the class. By circling red entries when delinquencies are excusable, no stigma attaches in such cases.

Demonstration Desk.—A teacher's drop-leaf demonstration desk is essential. It should be located on a raised platform so situated as to enable every member of the class to observe every detail of operation during the course of demonstrations of correct technique made by the teacher, visiting expert, or pupil. The desk should be of the "efficiency" type, with the usual drawer space and other facilities for effectively organizing the teacher's activities, materials, records, etc.

Rhythm Mechanism.—A device of one kind or another for use in rhythmic drills is desirable. A metronome will do. A Victrola may be better. If it is a part of the equipment of the department of music, it may be borrowed occasionally as needed.

Miscellaneous.—Keyboard wall charts should be available. Every room should be equipped with running water because of the frequent need to cleanse hands soiled by handling ribbons and carbon paper. This saves time. A bookcase is desirable, as is a simple file for supplementary instruction material. One up-to-date "academic" or "collegiate" type dictionary should be placed conveniently in the room, and there should be a smaller dictionary in the drawer of each typewriter table.

Teacher Mary Jones Period Third Class Typing I Year 32

Students		1	2	3	4	5	6	7	8	9	10	11	12	13	etc.
	Budget Due	9/15	9/18	9/20	9/21	9/23	9/24								
Andrews, Susan		9/15	9/19												
Briggs, John		9/16	9/20												
Carson, Ellen		9/14	9/17												

A PUPIL PROGRESS CHART FOR TYPEWRITING CLASSES

Shorthand

Desks.—No unique equipment in the way of chairs, desks, etc., is needed for shorthand work. It has been found that the classroom individual combination-chair-and-desk, with generous writing space, is best adapted to the needs of shorthand classes below the "stenographic practice" stage. It occupies little space, and 30 such chairs can be set far enough apart in a normal classroom unit to permit easy access to each pupil from all sides. They cost less than separate desks and chairs. They separate pupils by enough space to eliminate copying. They make possible an approximation to the normal office conditions under which stenographers work. Angle-ironed to the floor, these lighter chairs are as rigid as heavier and more expensive chair-and-desk combinations. Since the writing bed is adjustable, proper relationship between body and writing surface for people of different sizes is maintained with no difficulty.

Stenographic Practice Classes.—Pupils should obtain some of their stenographic practice in school offices or in business offices outside the school. Preliminary to this there should be basic instruction and practice in the functional activities of a stenographer. These activities should be carried on in a model office if possible. Such an office may well be one of the sections of the clerical training department whose equipment is discussed briefly later in this article. There should be the usual office desks, typewriters, duplicating devices, files, etc., which are found in any well-equipped office. Since all such equipment should be found in the clerical department, it is desirable not to duplicate it unnecessarily for the stenographic group.

Bookkeeping

Desks.—In the subject of bookkeeping, emphasis has been shifted from the routine recording of entries to the principles of accounts and their significance in constructing a set of records for the guidance of management. Multitudinous vouchers, forms, and blanks no longer play a large part in giving instruction in this course. No longer is the extra-large "commercial desk" required, with its lift top or drawer space for supplies, and "rack" on which to lay temporarily blanks, forms, vouchers and "files" when not in use. Such a desk is wasteful of space and unnecessarily expensive. A somewhat smaller, flat-top desk with two inkwells will meet all requirements. An adjustable chair is essential, since there is considerable writing to be done.

Retail Salesmanship

Retail salesmanship is one of the newer vocational skill subjects in the high school program of commercial education. It requires as much time as shorthand, bookkeeping, or clerical practice. Since little effective training can be given for selling in stores without actual practice on the job, cooperative courses are almost universal in this field. They insure to each pupil an opportunity to become familiar with the equipment used in stores. Skills of the usual sort play but small part in store work outside the office department. Hence, practically no special equipment is needed in a school training department. Such as is required varies with the needs of local situations, is inexpensive and is easily procured. No detailed list need be included in this statement.

Courtesy of American Seating Co.

A MOULTHROP CHAIR FOR SHORTHAND CLASSES

Clerical Practice

Clerical practice should be on a par with shorthand, bookkeeping and retail selling in the high-school curriculum. For pupils who elect it as their vocational major, it should require as much time and carry as much graduation credit as shorthand or bookkeeping does for those who choose either of these subjects. For pupils who elect it as a minor part of stenographic or bookkeeping training, it will occupy less time and carry proportionately less credit.

With the facts established that a majority of high school pupils lack the interest, aptitude, and ability essential to success in either stenographic or bookkeeping positions, and that only about 2 per cent of office workers are bookkeepers and less than 10 per cent stenographers, it should be clear that many more boys and girls should be interested in, and have the opportunity to prepare for, the more numerous and equally lucrative clerical positions now available to them.

The author of this article, in collaboration with the National Office Management Association, made a study of office work and workers with a view to determining what should be included in a clerical training curriculum and the equipment

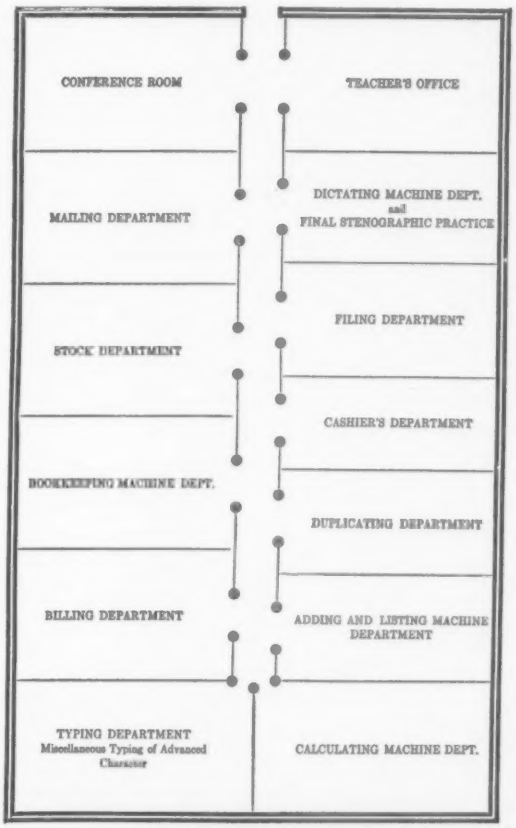
which would be needed.* The following statement from the report of that study sets forth clearly what equipment is needed for this department.

Units.—Clerical training should be given on a unit basis. To make this possible, office duties should be brought together in the smallest possible number of groups. The following twelve groups seem to meet the need for homogeneous classification: (1) Calculating Machine, (2) Recording, (3) Merchandise Clerical, (4) General, (5) Filing and Indexing, (6) Cashiering, (7) Typing, (8) Correspondence, (9) Mail Handling, (10) Duplicating, (11) Billing, and (12) Dictating Machine.

The clerical training department of the secondary school (public or private, full-time or part-time) may be organized as is suggested in the accompanying diagram.

Kinds and Approximate Cost of Complete Clerical Training Department Equipment.—The figures which follow have been obtained from the manufacturers of the equipment concerned. In some cases there are machines of different styles at different prices. Also, the furniture suggested may be obtained for less in some localities, and in not a few places a portion of this equipment can be made in the manual training department. It is also possible that lower prices or discounts can be obtained from some manufacturers for equipment intended for school use under present economic conditions. Some concerns which do not make allowances in the form of cash discounts give added service free of charge. The main pur-

* Bulletin No. XII, "A New Conception of Office Practice." Harvard University Press, Cambridge, Mass.



PLAN FOR A HIGH SCHOOL CLERICAL TRAINING DEPARTMENT

Courtesy of Remington Rand, Inc.

A CLASS IN FILING METHODS, KINMAN BUSINESS UNIVERSITY, SPOKANE, WASH.

pose of this statement concerning the cost of an adequate clerical training equipment is to give the outside amount which can be made the basis of local calculations.

It should be remembered that if two or three schools in the same community are giving commercial education of the clerical type, it should be possible to move some of the machines from one school to the other according to need. By working out a schedule it should be possible to make one set of machines serve the needs of two schools. In this way much expense can be saved to both.

A local survey may reveal the need for office devices not mentioned here. The list is not intended to be a complete catalog of office appliances. It is confined to the kinds used by office workers common to most large business offices.

Conference Room			
12 Arm chairs (oak)....at $8.50	$ 102.00		
3 Tables .....at $18.00	54.00		
			$156.00
Mailing Department			
3 Tables .....at $14.50	$ 43.50		
1 Addressograph equipment	300.00		
1 Envelope opener	30.00		
1 Envelope sealer	100.00		
4 Chairs .....at $6	24.00		
6 Trays .....at $.75	4.50		
			502.00
Stock Department			
3 Tables .....at $14.50	$ 43.50		
4 Chairs .....at $6	24.00		
			67.50
Bookkeeping Machine Department			
4 Chairs .....at $6	$ 24.00		
1 Burroughs special combination school machine	450.00		
1 Underwood No. 3-14".....	780.00		
1 Remington	708.75		
1 Elliott-Fisher No. 702-16"....	735.00		
1 Dalton	845.00		
			3,542.75
Billing Department			
1 Elliott-Fisher	$ 191.25		
1 Remington	85.75		
1 Underwood, Fanfold	187.50		
1 Burroughs typewriting-multiplying biller	855.00		
4 Tables .....at $14.50	58.00		
5 Chairs .....at $6	30.00		
1 Remington vertical adder	258.75		
			3,133.75
Typing Department			
6 Typewriter desks, 3-drawer 38" x 30" drop head at $28.75	$ 172.50		
6 Chairs, typewriter desk type .....at $9	54.00		
1 Table 40" x 30"	14.50		
1 Decimal tabulator	127.50		
5 Typewriters .....at $70	350.00		
1 Chair	6.00		
			724.50
Teacher's Office			
4 Conference tables 40" x 30" .....at $14.50	$ 58.00		
6 Chairs .....at $6	36.00		
1 Semi-roll-top desk	47.50		
1 Teacher's chair	11.50		
			153.00
Dictating Machine Department			
2 Ediphone secretarial units complete	$ 410.00		
2 Dictaphones complete	400.00		
1 Complete set of Permanent Practice Records for Instruction Purposes	36.00		
1 Complete Business Practice Textbook	.80		
6 Combination typewriter desks .....at $28.75	172.50		
6 Typewriters .....at $70	420.00		
6 Typists' chairs .....at $9	54.00		
			1,493.30
Filing Department			
1 Yawman and Erbe outfit complete		$ 175.00	
1 Library Bureau practice outfit for 10 students		137.50	
1 Kardex practice outfit for 10 students, including No. 8506x cabinet		153.00	
1 Paper fastene		6.00	
6 Wire baskets .....at $.75		4.50	
1 Table		14.50	
3 Chairs .....at $6		18.00	
			508.50
Cashier's Department			
4 Desks .....at $18.00		$ 72.00	
4 Chairs .....at $6		24.00	
			96.00
Duplicating Machine Department			
1 Multigraph outfit		$1,000.00	
2 Mimeographs .....at $185		370.00	
6 Hektographs .....at $2.50		15.00	
2 Tables .....at $14.50		29.00	
4 Chairs .....at $6		24.00	
			1,438.00
Adding and Listing Machine Department			
1 Burroughs adding machine ...		$ 72.00	
1 Burroughs adding-direct subtracting machine with wide carriage		135.00	
1 Victor 8-bank subtractor.....		85.00	
1 Sundstrand		100.00	
1 Dalton		125.00	
4 Chairs .....at $6		24.00	
			541.00
Calculating Machine Department			
1 Monroe		$ 148.75	
1 Comptometer		300.00	
1 Burroughs		72.00	
1 Dalton		125.00	
1 Sundstrand		120.00	
2 Tables .....at $14.50		29.00	
8 Chairs .....at $6		48.00	
			842.75
Total.....			$13,199.05

Such a clerical training department as is here described could be used for short units of training desired by any competent person of high school age or older and entirely independent of any other high school work. Thus to a certain extent an "opportunity school" would be provided without additional cost.

If one large room is not available, two or three adjacent rooms can be used. In new buildings, or in old buildings where remodeling can be done, the large room should be provided.

Some new equipment would be needed by most schools, but an inventory in many schools will reveal a considerable amount of the specified equipment scattered among the school offices and commercial rooms.

Any commercial teacher who is discouraged by the high cost of such equipment should find comfort and encouragement in an inventory of the equipment provided for industrial courses in his school. A comparison of the per capita cost of commercial and industrial equipment will prove enlightening to most teachers.

Final Suggestions

1. No equipment should be purchased unless actually needed for instruction purposes. If a cooperative plan can be worked out whereby each pupil may work in an actual business office during the latter part of his clerical training, fewer school office machines will be needed, since only the initial skill training will be given in school.

Courtesy of A. B. Dick Co.

BUSINESS TRAINING BEING PUT TO USE IN GETTING OUT THE SCHOOL PAPER AT THE OWEGO FREE ACADEMY, OWEGO, N. Y.

2. A "museum" or "collection" of office devices serves no useful purpose not achievable in less expensive ways.

3. "Batteries" of office machines, except typewriters, are unnecessary. One of each type, as has been shown, is preferable to many of a single type or even of a few types.

4. "Dead" machines unnecessarily increase costs. Each machine should be used continuously.

5. Rebuilt machines are satisfactory and cost less. It is not necessary to use only machines that are "up-to-the-minute."

6. It pays to keep equipment in repair, but when repair records show that upkeep has become excessive, a machine should be exchanged.

7. Equipment which is not needed for practice in developing skill should not be purchased. Demonstrations may be arranged for with its makers.

8. The policy of allowing only those who have a vocational interest in a machine to use it should be adopted. Most young people are interested in machines as playthings. Discrimination between these two kinds of interest will greatly reduce equipment costs.

9. Remember that the cost per pupil of equipment used by industrial pupils in the high schools of the country is several times the cost of needed equipment for commercial departments.

10. By turning over to a clerical department such as is here described all appropriate work originating in the school's offices, including those of the principal, department heads, students' association, school paper, bookstore, lunch room, school bank, clubs, librarian, and teachers, it should be possible to reduce materially the cost of running this department by crediting to it savings effected in the operation of these other offices. It should become a real service department to the whole school.

11. To make a beginning in the direction of equipping a clerical practice room, all equipment now in use in the school should be inventoried before deciding on what is needed.

12. The teacher of clerical practice should be a capable office manager who is familiar with the "job-sheet" method of instruction and office standards of work and conduct. He should be resourceful and keep in touch with all developments in well-managed offices.

13. As far as possible, furniture included in this statement should be made in the local industrial arts department according to specifications set up by the department of commercial education.

EASTMAN TEACHING FILMS, INC.

SUBSIDIARY OF EASTMAN KODAK COMPANY

Rochester, New York

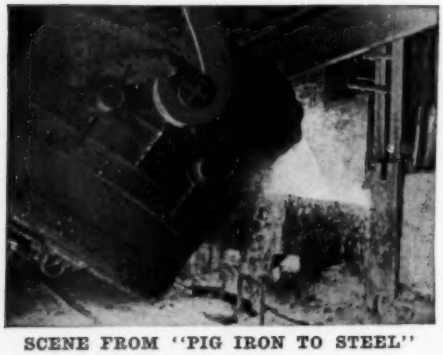
APPLIED ART

Models in Motion

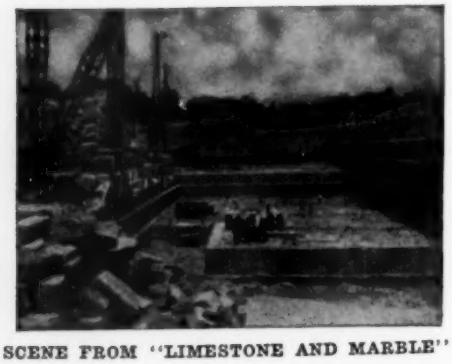
ENGLISH

The Farm

SCENE FROM "SILVER"



SCENE FROM "PIG IRON TO STEEL"



SCENE FROM "LIMESTONE AND MARBLE"

GEOGRAPHY

Alaska
The Arid Southwest
The Automobile
Bahamas — From the Bahamas to Jamaica
Bolivia
The Boone Trail
Cattle
Central America
Chesapeake Bay
Coal, Anthracite
Coal, Bituminous
Coffee
Copper, Mining and Smelting of
Corn
Cotton Goods
Cotton Growing
Dairies, Wisconsin
Dutch East Indies
East Indian Island
Electric Power in the Southern Appalachians
From Flax to Linen
Furniture Making
Glacier National Park
Gold
The Golden Gate
Haiti—From Haiti to Trinidad
Hawaiian Islands
Iron Ore to Pig Iron
Irrigation
Lead
Leather
Liners, Ocean
Lumbering in the Pacific Northwest
Market Gardening
Meat Packing
Mexico
Mohawk Valley
New England Fisheries—Part I—Cod
New England Fisheries—Part II—Mackerel
New Orleans
Oil, Producing Crude
Oregon Country
Overland to California
Panama Canal
Peanuts
Peru
Philippine Islands
Pig Iron to Steel
Porto Rico
Pueblo Dwellers
Railroad Safety
The Rio Grande
Rubber
Safety at Sea
Salmon, Pacific Coast
Salt, Common
Shark Fishing
Sheep, Range
Silk
South America, Continent of
Sugar, Beet and Cane
Sugar, Maple Syrup and
Tableware
Tin
Transportation on the Great Lakes
Tree to Newspaper, From
Virginia—the old Dominion
Washington—The Capital City
Wheat
Wheat to Bread, From
Woolen Goods
Yellowstone National Park
Yosemite National Park

HEALTH

Bacteria
The Blood
Body Framework
Breathing
Cell, The Living
Circulation
Circulatory Control
Cleanliness Series:
Bathing
Clean Clothes
Clean Face and Hands
Keeping the Hair Clean
Digestion
Diphtheria
The Feet
First Aid—Care of Minor Wounds
Food and Growth

HEALTH (Cont'd)

Good Foods:
- Bread and Cereals
- Fruits and Vegetables
- Milk
- A Drink of Water

Home Nursing Series:
- The Bed Bath
- Routine Procedures
- Special Procedures

Mold and Yeast
Muscles
Posture
Sewage Disposal
The Skin
Teeth, Care of the
Teeth—How Teeth Grow
Tuberculosis and How It May Be Avoided

HISTORY

George Washington—His Life and Times

NATURE STUDY

The Adventures of Peter
Beavers
Beavers, Baby
Bird Homes
Birds, Game
Birds of Prey
Birds of the Seacoast
Birds, Some Friendly
Birds, Wading
Burbank, Luther
Flowers, Wild
Grouse, The Ruffed
Insects, Some Water
Mammals, Rocky Mountain
Mammals, Some Larger
Oysters
The Raccoon
Seashore Animals, Some
Under-Sea Life

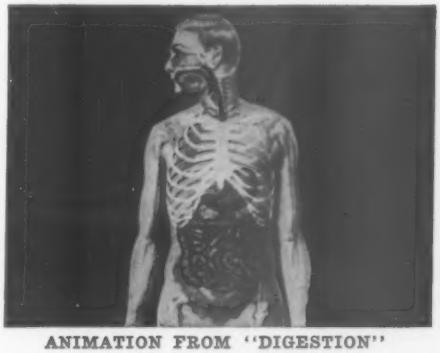
RELIGION

The Sacrifice of the Mass

SCIENCE

Atmospheric Pressure
Book, Making a
Compressed Air
Electricity, Chemical Effects of
Electricity, Heat and Light from
Electricity, Magnetic Effects of
Energy from Sunlight
Fire Making
Fire Prevention
Fire Protection
Fire Safety
Frequency Curves
Gas Engine, Four-Stroke Cycle
Glass Blowing Technique
Heating, Hot Air
Illumination
Induced Currents
Lenses
Light, The Behavior of
Limestone and Marble
Machines, Simple
Microscopic Animal Life
Mosquito, Life History of the Yellow Fever
Oil, Refining Crude
Optical Instruments
Potato Enemies
Reforestation
Refrigeration
Sand and Clay
Silver
Soap
Spiders
Steam Power
Termites
Trees, Planting and Care of
Volcanoes
The Water Cycle
Water Power
Water, Purifying
Water Supply, New York
Weather Forecasting

SCENE FROM "FLAX TO LINEN"



ANIMATION FROM "DIGESTION"

SCENE FROM "MEXICO"

These films are all available on 16-millimeter safety stock only, with the exception of *George Washington—His Life and Times, The Sacrifice of the Mass,* and *Tuberculosis and How It May Be Avoided.* These may be had on 35-millimeter film as well. Write for full information and literature.

EASTMAN CLASSROOM FILMS

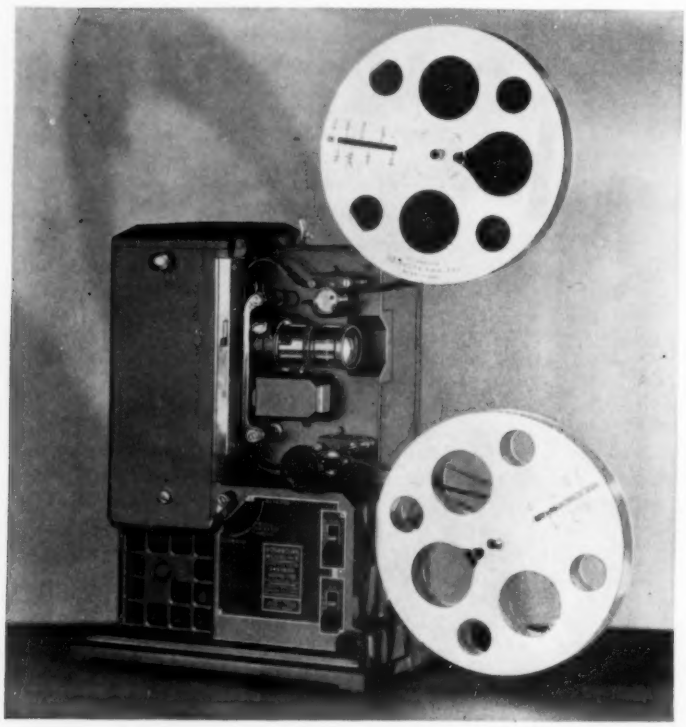
THE AMERICAN SCHOOL AND UNIVERSITY

EASTMAN KODAK COMPANY

Rochester, New York

MOTION PICTURE EQUIPMENT

For Use In School Or Home



Kodascope, Model K

This is Eastman's latest 16-mm. movie projector, and one that is particularly suitable for classroom use because of its simplicity of operation and sturdy construction.

One of the outstanding features of Kodascope, Model K, is maximum screen brilliance. This means a startling improvement in the screen quality of both Kodacolor (full color movies) and black and white pictures. Illumination for the Model K is direct and is provided by a special 260-watt lamp. It has a receptacle for plugging in a floor or table lamp which operates alternately with the Kodascope lamp switch.

There is no fumbling around in the dark for controls on the Model K. Forward, reverse, rewind and still picture lever, focusing lever, elevating device, rewind control, separate switches for lamp and motor, controls for lamp brilliancy and motor speed, are all easily accessible. An indirectly illuminated ammeter facilitates control of lamp current.

Rewinding on the Model K is done at high speed. Four hundred feet of film are rewound in less than 30 seconds. Threading is extremely simple and the picture area of the film cannot be scratched in any part of the Kodascope.

The projection lamp can be quickly replaced and the optical parts are easily accessible for cleaning. Most of the bearings are lubricated from a central point.

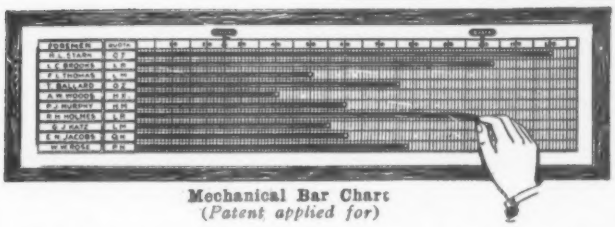
Kodascope, Model K (100-125 Volts, A.C. or D.C.) equipped with 2-inch lens for maximum black and white picture brilliance. Complete outfit includes two 400-foot reels, extra lamp, film splicing and oiling outfits, $160. Carrying case, $15, extra. Other lenses of various focal lengths for larger projection throws are available.

EDUCATIONAL EXHIBITION COMPANY

Graphic Record Supplies, Chart, Maps, Display Fixtures

MAIN OFFICE AND FACTORY

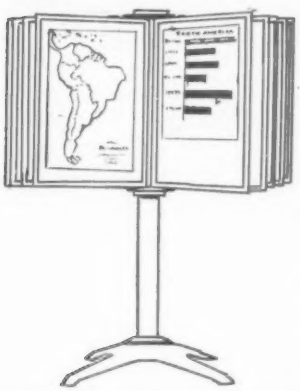
126 Custom House St., Providence, R. I.



Mechanical Bar Chart
(Patent applied for)

Mechanical Bar Charts—For comparing work by pupils, classes or rooms. Bars instantly adjustable and can be of different colors. Scale to read in percentages or units.

Motivation Charts—Smaller paper charts with patent device for making bars mechanically in black, red or blue. When completed are filed away for reference. A very inexpensive device.

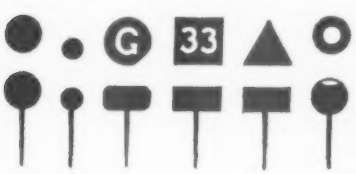


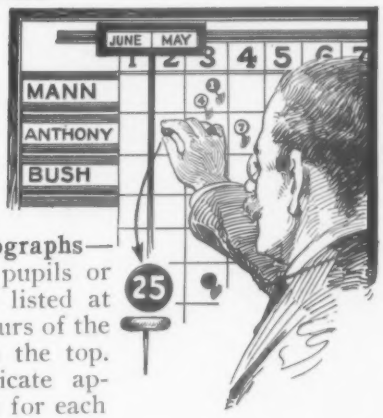
Swinging Leaf Fixtures—Like leaves of a large book with cork or other fillers. Several styles including lecture type.

Drop Leaf Device—Board at top fastened to upper blackboard frame. Leaves of heavy manila stock drop from fastenings at top so that both sides are available. Can be used for diagrams, or pictures and maps can be pasted on.

Cork Map Mount—Usable for bulletin boards. Can be faced with blackboard cloth to furnish cork-back blackboards, with or without glass doors.

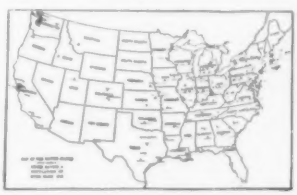
Map Pins—Sixteen colors, over thirty-one styles. School superintendents use these on city maps for showing locations of pupils' homes in planning bus routes or locating new school buildings, also for scheduling classes and other events on—

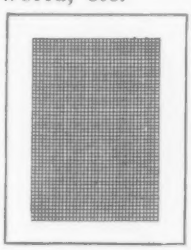




Remindographs—Names of pupils or rooms are listed at the left, hours of the day across the top. Pins indicate appointments for each hour. Cork back.

Outline Maps—8½ x 11 up to 44 x 64 inches, showing states only, cities and states, counties of United States, continents, world, etc.





Charting Paper—8½ x 11 any style, same as used by large business firms. Also large sheets for lecture display.

Celluloid Envelopes—8½ x 11 inches and smaller for covering pictures or data frequently handled.

Four-Color Pencils—One pencil with four different colored leads for diagrams, checking and correcting papers. Mailed postpaid on receipt of $1.00.

Multivider Pencil—Combines in one the advantages of a slide rule and high grade mechanical pencil. Accurate and durable.

Lantern Slides—Public Health Subjects, Famous Sanitarians, School and Child Hygiene, Flies, Mosquitoes, Milk, Babies, Care of Teeth, etc. Send for lists. Lantern slide storage cabinets.

Other Items—Gummed Paper Letters, Colored Card Signals, Report or Thesis Binders, Lettering Pens, Lettering Guides, Stop Watches, Tally Counters, Pictorial Maps. Write for details of any of these items.

WESTERN ELECTRIC COMPANY

New York, N. Y.

Distributor in the United States

GRAYBAR ELECTRIC COMPANY

Graybar Building, New York, N. Y.

Distributor for Canada and Newfoundland

NORTHERN ELECTRIC COMPANY, LIMITED

General Sales Offices: 637 Craig Street, West, Montreal, P. Q.

Western Electric

SYSTEMS FOR PUBLIC ADDRESS, MUSIC REPRODUCING, ANNOUNCING AND PROGRAM DISTRIBUTION

General

The Western Electric Public Address and Music Reproduction System amplifies, reproduces, and distributes speech and music to an audience of any size in room or auditorium—or to various parts of a building.

A Microphone Picks Up the Sound

Developed by Bell Telephone Laboratories for the Western Electric Co., this system has steadily increased its scope of educational and commercial usefulness.

Men who plan modern school buildings are including this equipment in their specifications.

Modern School Systems Find This Equipment Invaluable

Public Address and Music Reproduction System

The parts of a Public Address System are:

(1) One or more microphones for "picking up" sound
(2) The Western Electric Music Reproducer Set, if recorded entertainment is desired
(3) A receiving unit, if radio programs are to be reproduced
(4) "Mixing" and control panels
(5) Amplifying apparatus
(6) Observer's communicating system for auditoriums
(7) Receivers and projectors or loudspeakers
(8) Necessary wiring and circuits

By using microphones and a selective system, school announcements and instructions may be simultaneously delivered to as many classrooms and to as many students as required. In conjunction with the Western Electric Music Reproducer Set, the Public Address System can be operated with standard laterally-cut phonograph records at low cost. In conjunction with a receiving unit, radio programs may be reproduced with original effectiveness.

Uses in Schools

1. Transmitting fire drill instructions
2. Conveying a general order to all rooms at once
3. Transmitting music from the auditorium or from a music teacher to one or more rooms as desired
4. Transmitting gymnasium instructor's commands to all rooms at once
5. Conveying a visitor's, or a special instructor's speech to all parts of the building
6. Receiving and transmitting educational radio programs to all rooms
7. Supplying recorded music from the reproducer for Music Appreciation courses at any time or to any room that fits your schedule
8. Amplifying speaker's voice in auditorium, particularly important for children's weak voices

This Music Reproducer Set Is Always Ready to Reproduce a Program of Recorded Entertainment or Instruction

A Graphic Interpretation of the Manner in Which the Public Address System Unites All Classrooms into One

Schools and Colleges Equipped with Western Electric Public Address Systems

Cooley High School, Detroit, Mich.
University of North Carolina, Chapel Hill, N. C.
Claremont High School, Claremont, N. H.
State Agriculture College, Fort Collins, Colo.
University of Texas, Austin, Texas
Herbert S. Hadley School, St. Louis, Mo.
Long Beach High School, Long Beach, N. Y.
Alcee-Fortier High School, New Orleans, La.
Seminary of the Immaculate Conception, Huntington, N. Y.
Huntington Beach Elementary School, Huntington, Cal.
N. J. State College for Women, New Brunswick, N. J.
University of Wyoming, Laramie, Wyo.
College of the City of New York, New York, N. Y.
East End Junior High School, Richmond, Va.
The Robert E. Lee School, New Orleans, La.
School District No. 34, Belfry, Mont.
St. Patrick's School, Eau Claire, Wisc.
Texas School for the Deaf, Austin, Texas
Abraham Lincoln High School, Brooklyn, N. Y.
Mamaroneck School, Mamaroneck, N. Y.
Junior College, Monroe, La.
School of Dentistry and Pharmacy, Baltimore, Md.
Norwalk Public School, Norwalk, Conn.
Milwaukee Vocational School, Milwaukee, Wisc.
Central High School, Tulsa, Okla.
Robert Fulton School, Minneapolis, Minn.
Hope High School, Hope, Ark.
New Kensington High School, Pittsburgh, Pa.
University of Oregon, Portland, Ore.
Agnes Scott College, Decatur, Ga.
Electrical Trade School, Cincinnati, Ohio
Tustin Union High School, Tustin, Calif.
Miami University, Oxford, Ohio
Grant School, Syracuse, New York
Jefferson Davis High School, San Antonio, Texas

(For other installations see page 333, 1931-1932 edition of this yearbook.)

Cost

The cost of a Public Address System installation is relatively small, considered in the light of its variety of uses—and of the profitable returns direct and indirect from those uses.

The Western Electric Architect's Specification Folder gives complete information on all types of installations and all other data necessary to estimate requirements for any given job. It is available on request direct to Western Electric or through Graybar.

Engineering consultation on any problem can be had for the asking.

Developed and perfected by Bell Telephone Laboratories, the research laboratories of the American Telephone and Telegraph Company and the Western Electric Company, the Public Address and Music Reproduction System has the latest electrical developments as applied to sound transmission. Western Electric workmanship guarantees the quality and dependability of the system.

Service

Western Electric maintains an emergency stock of repair parts at strategic locations throughout the country.

Testing the Hearing of Pupils with Western Electric No. 4-A Audiometer

Audiometers

Poor classwork by students often is caused by defective hearing. Western Electric No. 4-A Audiometer measures acuity of hearing quickly and accurately with the same standard of measurement for all examined. Essentially a phonograph to which telephonic apparatus has been added, sounds produced in the phonograph are transmitted to the ears of those under examination.

The Audiometer is of particular advantage in measuring the amount of noise present in classrooms or in determining the noise insulating properties of building materials.

Audiphones

For the students with defective hearing the Western Electric Company is prepared to supply either individual or group hearing aids (audiphones), further details of which may be had upon request.

ELECTRICAL RESEARCH PRODUCTS INC.

Subsidiary of

Western Electric Company

Main Office: 250 West 57th Street, New York, N. Y.

There is a Western Electric Sound System to Meet Your Particular Needs

There are Western Electric Sound Systems—

For every type, shape and size of auditorium;
Designed to operate with any type of standard motion picture projector;
With motion picture projector furnished as an integral part of the equipment;
For permanent installation;
For "mobile" use (on stand, to be moved to various locations within building);
For portable use (packed in trunks);
For projecting 16-mm. sound pictures;
To which may be added Western Electric Public Address, Announcing, Radio and Music Distributing Systems.

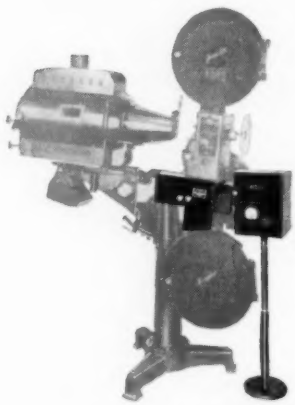
Every Installation Specially Engineered

For faithful, lifelike reproduction and dependable performance, specially engineered installation is essential.

In every case, the type and size of a suitable Western Electric System are determined by a careful survey and, among other factors, depend upon volume, shape, seating capacity and acoustic characteristics of auditorium; make of motion picture projectors to be used; length of "throw" and power supply available.

The survey also takes into consideration auditorium "absorption" and "reverberation"; physical nature of furnishings; extraneous noises and other conditions; and our nationally recognized group of acoustic experts recommend proper acoustic treatment, if needed.

A staff of some 500 service engineers permanently stationed in over 200 cities throughout the United States is available for service.

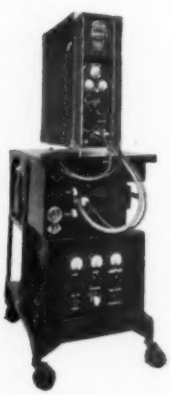


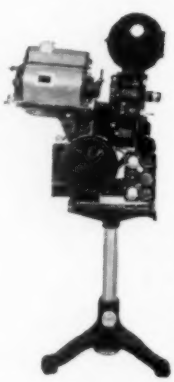
"A" TYPE REPRODUCER SET

For permanent installation in auditoriums of all sizes. Designed to operate with any type of standard motion picture projector

"E" TYPE REPRODUCER SET

Motion picture projector included as integral part of this unit—furnished on "mobile" stand as illustrated. For portable use, sturdy theatrical trunks available





"H" TYPE REPRODUCER SET

Motion picture projector included as integral part of this unit—arc or incandescent lighting—furnished on pedestal as illustrated for permanent installation or on stand for "mobile" use. For portable use, sturdy theatrical trunks available

Talking Pictures for Classroom Use . . .

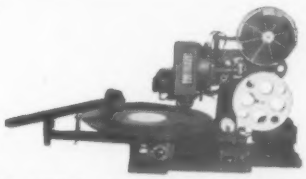
Electrical Research Products Inc., through its subsidiary ERPI Picture consultants, organized especially for research in educational talking pictures, has prepared a large number of films especially for classroom presentation.

Scene from "Transportation"—an educational talking motion picture produced by Electrical Research Products Inc.

Working with this organization in making these talking pictures are recognized educational authorities in the various fields. All pictures are the result of professional group judgment.

To the specialized knowledge of these men is added another kind of specialized knowledge—that of scenarists and directors experienced in talking picture production in the educational field.

Scene from "Jack and Jill in Songland"—an educational talking picture produced by Electrical Research Products Inc.



"M" TYPE 16MM. SOUND-ON-DISC SYSTEM FOR CLASSROOM AND OTHER USES

Motion picture projector included as integral part of this unit—complete system furnished in 2 "heavy duty" cases for carrying

The Following Professional Talking Pictures are Now Available—

TEACHER TRAINING SERIES

Dynamic Learning
Individual Differences in Arithmetic
The Elementary Teacher as a Guide
Guidance in Public Schools
The Creative Approach to Education
The Study of Infant Behavior
The Teaching of Reading
Child Growth
A Few Tests of Child Intelligence
The Primary Teacher at Work

CLASSROOM SERIES

Natural Science

Plant Growth
How Nature Protects Animals
The Dodder
Fungus Plants
The Frog
Butterflies
Seed Dispersal
Roots of Plants
Beach and Sea Animals
Aphids
Beetles
Flowers
Moths
Plant Traps
Pond Insects
Spiders
Tiny Water Animals
Zoo Animals

Music

The Symphony Orchestra and Its Instruments
Jack and Jill in Songland

Vocational Guidance

The Builders
Choosing Your Vocation
Transportation

Physical Education

Fundamentals of Football

Mathematics

The Play of Imagination in Geometry

ART METAL CONSTRUCTION CO.

Jamestown, New York

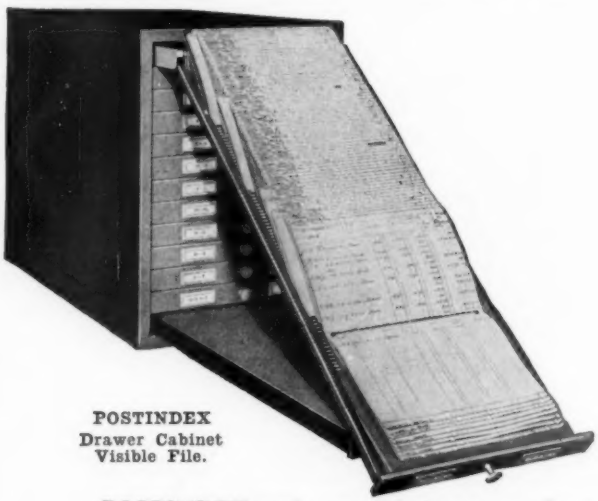
BRANCH OFFICES

Albany, N. Y., 100 State Street
Baltimore, Md., 124 West Fayette Street
Boston, Mass., 94 Federal Street
Chicago, Ill., 173 West Madison Street
Cincinnati, Ohio, 503 Duttenhofer Building
Cleveland, Ohio, 901 National City Bank Building
Dallas, Tex., 1704 Republic Bank Building
Detroit, Mich., 333 State Street
Hartford, Conn., 75 Pearl Street
Jamestown, N. Y., Jones & Gifford Avenues
Kansas City, Mo., 110 Scarritt Building
Los Angeles, Calif., 942 South Hope Street
Memphis, Tenn., 1759 Glenview Avenue
Minneapolis, Minn., 1441 Northwestern National Bank Building
New York City, 369 Broadway—25 W. 43rd Street
Philadelphia, Pa., Ninth & Sansom Streets
Pittsburgh, Pa., 315 Oliver Building
Seattle, Wash., 310 Columbia Street
St. Louis, Mo., 810 St. Louis Mart Building
Washington, D. C., 301 Southern Building
London, England, 199-203 Buckingham Palace Road

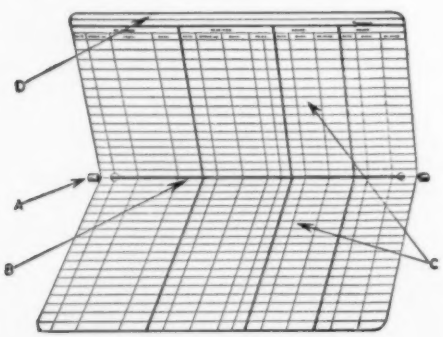
POSTINDEX VISIBLE FILES

—for all school and college records. Send for sample forms of any record in which you are interested.

Student—Permanent Scholastic
Student—Program
Student—Attendance
Student—Vocational Analysis
Student—Health
Student—Job Placement
General Ledger
Dormitory Ledger
Laboratory Ledger
Alumni Subscription
Teachers' or Instructors' Personnel and Salary
Purchase **Budget**
Stock **Library**



POSTINDEX Drawer Cabinet Visible File.



The Simplicity of the POSTINDEX Visible File Principle

A. This is the trunnion that operates in the channel at the side of the panel.

B. This is the anti-rust tempered spring wire that enables you to snap the form in and out of the panel at will.

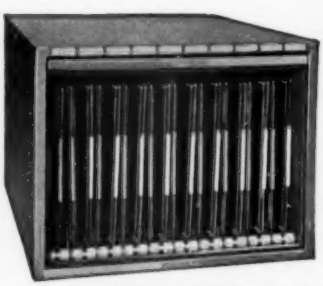
C. This shows two pages of the 4-page form, which gives you a writing area on an 8 x 5-inch form of 160 square inches, equal to a ledger page of 10 x 16 inches.

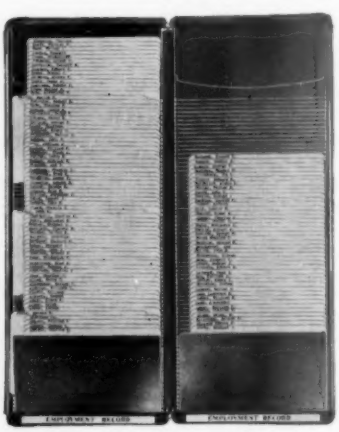
D. This shows the visible line where you type the name and address, or subject of the record you desire to carry.

. . . Adaptable to any record
. . . Four types of cabinet . . .

POSTINDEX cards are **ready to use** . . . there are no clips to put on . . . no holes to be punched . . . no edges to be folded over . . . no tabs to be glued to cards. After typing or writing the student's name and other information necessary, it takes but a second to insert the wire in the holes and snap it into the panel frame where the record stays ready to serve you instantly.

Changes are most easily and quickly made in Postindex files because of the exclusive Postindex card holder. Just snap it in . . . or out.





POSTINDEX Flat Book Visible File. Capacity of each Flat Book is 150 records. Any standard size of record Cabinets provide for 5, 10, 15 or 20 Flat Books.

This illustration shows Style 1550 F4B four-leg desk, especially suitable where a minimum of drawer space is required. The "1500 Line" consists of sixteen styles including regular flat top and typewriter desks.

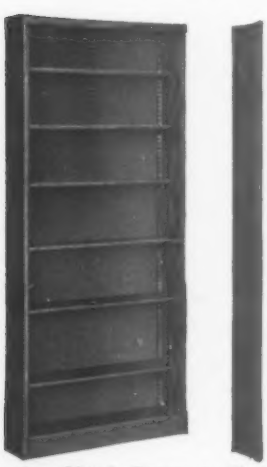
Art Metal Fire Safes, available in fifteen styles and sizes, preserve valuable records against fire or theft. They're tested and approved by the Underwriter's Laboratories.

This single pedestal typewriter desk is another popular member of the Art Metal "1500 Line." Standard equipment includes three box drawers, but two of these may be replaced with one deep, vertical file drawer.

Art Metal Storage Cabinets come in single and double-door widths and may be had with wardrobe fittings, also in desk heights for storage purposes.

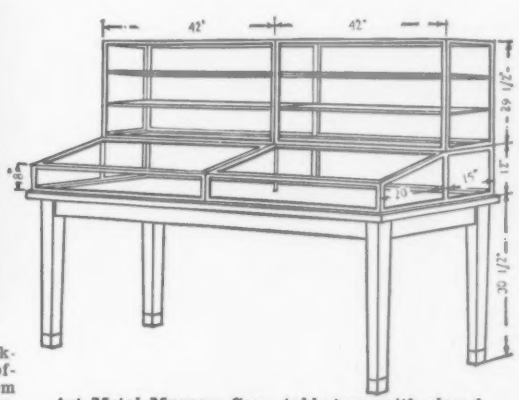
This four-drawer Letter File, Style 6841, is especially suited to the filing of letters, tariffs, reports, catalogs, etc. The "6800 Line" is 28 inches deep and there are 12 styles for standard records.

For the Supply or Store Room, Art Metal Steel Shelving comes in units that are easy to erect and easy to rearrange or expand in any direction. Illustration shows one typical arrangement of ledge shelving.



Art Metal Space-a-Shelf Book Unit, with detachable ends. Standard library shelf and adjustment.

Art Metal Sectional Bookcases, for the home or office, protect volumes from dust, vermin and dampness. They are easily assembled and rearranged at will. Economically priced.



Art Metal Museum Case, table-type with sloped top, single-faced with cabinet above. Send for information on the complete range of museum cases of all types.

ELECTRO-ACOUSTIC PRODUCTS COMPANY

2131 Bueter Road, Fort Wayne, Ind.

ADDRESS SYSTEMS AND SOUND MOTION PICTURE EQUIPMENT FOR THE SCHOOL

Electro Acoustic Systems offer the ultimate in time-saving and efficiency-promoting school equipment,

For making official announcements without calling an assembly;

For bringing educational broadcasts to a particular room, group of rooms, or to the entire school;

For announcing and stimulating interest in games and student events;

For making music available for gymnasium classes or auditorium groups;

For rebroadcasting auditorium programs to overflow groups;

For summoning individuals or groups to the central office;

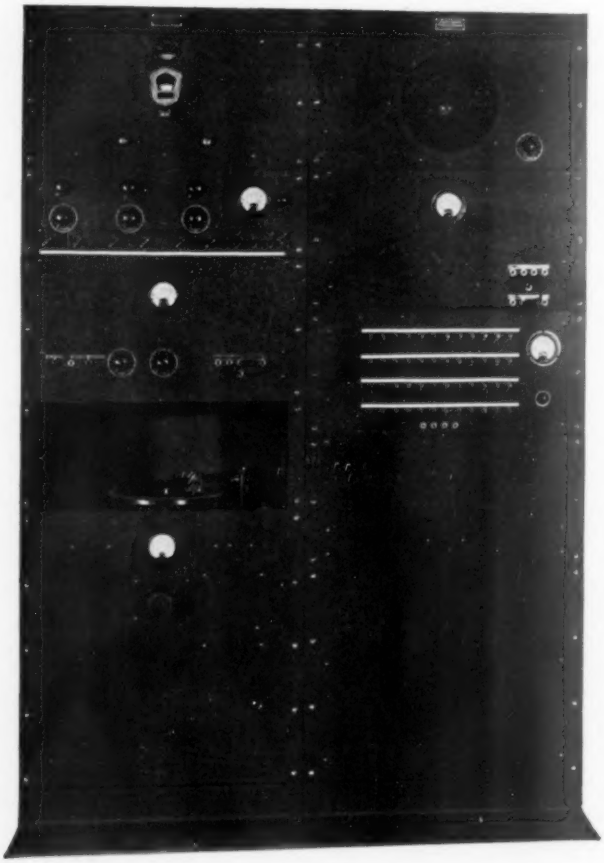
For directing the movement of students in emergencies, fire drills, etc.

With this equipment the student body can be addressed without the confusion or loss of time of a general assembly from any point where a microphone is located—the office of the principal—the rostrum of the auditorium. It may also be used as a public address system in the school auditorium to make certain that every word spoken on the stage is audible throughout the entire room.

Electro-Acoustic Systems are preferred because of their exceptional fidelity of reproduction. The amplified voice retains all of its individual characteristics and inflections. Music remains true to the original, the deep bass of percussion and stringed instruments is brought out with startling reality—high piano notes are rendered with all their overtones and harmonics — indistinguishable from the original.

Any number of loud speakers or reproducers may be operated—every room within range of your voice.

Electro-Acoustic Systems are as effective in small schools as in large institutions with many buildings located around an extended campus.



Control equipment for the Electro-Acoustic Model 70 School Systems in use at West Division High School, Milwaukee, and Walnut Hills High School, Cincinnati. Several models of various size are available.

EDUCATION ADVANCES STEP - BY - STEP WITH SCIENCE

VISUAL EDUCATION EQUIPMENT

The printed word is the slowest means of conveying an idea. The spoken word is quicker and awakens more response. A picture tells more in less time than either the printed or spoken word. Add motion to the picture and the idea is grasped still more readily. And the sound motion picture combining the spoken word, motion and picture is the most perfect means of registering an idea. . . . **It is the closest known approach to actual experience.**

The new Electro-Acoustic 35 mm. Sound Motion Picture equipment opens to your school the use of educational and entertainment sound films with results equal to those obtained in the finest commercial theatres. It is fully capable of performing visually and audibly in any type of auditorium. Talking pictures up to 12′ x 16′ can be projected clearly.

Or schools now owning one or more silent projectors—Powers, Simplex or Motiograph—can recondition and equip for sound - on - film operation with Electro-Acoustic "Sound Head" attachments.

The engineers who have developed and perfected Electro-Acoustic Systems invite requests from school officials for any information on installing and adapting these modern educational aids to their schools.

The Simplex Acme 35 mm. Sound-on-Film Projector is extremely simple in operation.

Prices are astonishingly low. Electro-Acoustic Sound Distribution and Visual Educational Equipment is sold by, and installed under the supervision of, direct factory representatives.

Write for details.

Gymnasium

Classroom

Auditorium

Electro Acoustic Systems / SOUND ELECTRICALLY REPRODUCED

THE AMERICAN SCHOOL AND UNIVERSITY

GAYLORD BROS., INC.

The House of Friendly Understanding, Prompt Service and Personal Attention

Library ***Equipment***

Stockton, Calif. Syracuse, N. Y.

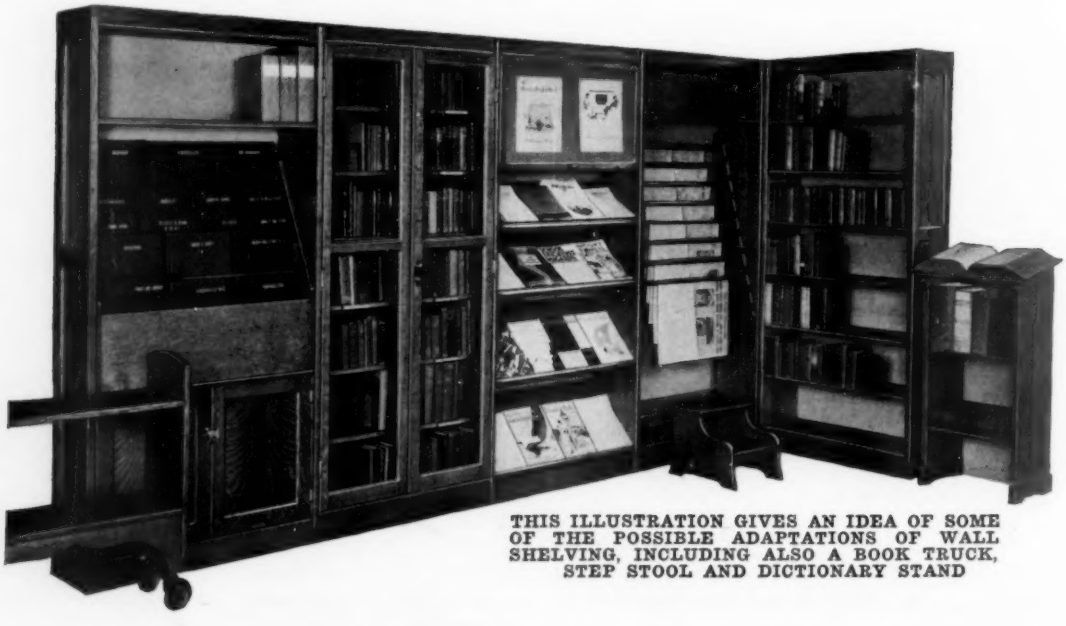
A COMPLETE LINE of Library furniture and equipment—all manufactured in our own factory by Gaylord craftsmen—Book Shelving—Sectional Card Catalog Cabinets — Dictionary Stands — Display Cases—Magazine Racks—Sectional Charging Desks — Tables — Chairs — Book Trucks, etc.

SERVICE WITHOUT CHARGE. It is a part of Gaylord Service to give free advice on any specific problems in connection with the equipment and operation of any Library. All inquiries are given immediate and careful attention. Our Consulting Librarian will gladly give advice or answer any technical questions which are submitted to us.

Suggestions, plans and layouts for new Libraries or for the rearrangement of present Libraries will be given by our expert furniture consultant.

Write for complete catalog. Every item listed is carried in stock both at our Syracuse factory and at our Western branch in Stockton, California. Prompt shipments are therefore assured, as orders can be quickly filled from either point.

Inquiries are solicited.



THIS ILLUSTRATION GIVES AN IDEA OF SOME OF THE POSSIBLE ADAPTATIONS OF WALL SHELVING, INCLUDING ALSO A BOOK TRUCK, STEP STOOL AND DICTIONARY STAND

EVERYTHING FOR THE LIBRARY . . . .

Bulldog Magazine Binders

The best protection for current magazines. "Bulldog" is the strongest, most durable and serviceable Binder of this type. Two pairs of jaws hold the magazine firmly yet enable the reader to conveniently hold and read the magazine. Magazines cannot be removed without key.

See our Catalog for complete description.

Send for Your Copy of BOOKCRAFT

Lengthen the life of books now in use. Bookcraft tells how. The Time Tested Toronto Method of Library Book Repairing adapted for use as an industrial art subject and for teaching book repairing in school or public library. Saves money because it saves books!

BOOK POCKETS — Our new "L" Pockets are made of an exceptionally strong, tough, tear resisting, yet lightweight paper in white, blue and buff. They have the top edge folded double so that cards will not tear the corners. Printed if desired.

Size 3½ in. wide by 4½ in. high. Front 3¾ in. high.

POSTERS — Artistic, Striking

Stimulate interest in books by the use of Posters! Effective for advertising books on definite subjects and for featuring special exhibits.

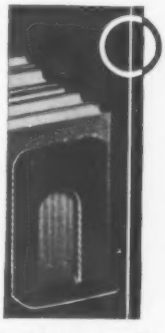
Create more interest in books on various subjects by the use of our attractive Posters.

DOUBLE BOOK EXHIBITOR The 2 Shelf

Displaying books attractively will increase their circulation.

The Gaylord Double Book Exhibitor provides two shelves on which books, lists or posters may be displayed attractively.

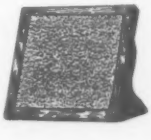
Splendid for reference books, extremely effective in drawing attention to new volumes.



OVERSIZE Book Supports

Ideal for classroom or library. Designed to keep large books upright on the shelves. Well proportioned, large and strong enough to hold those big heavy volumes. Sturdy in construction and material. They will not bend. Nicely furnished in black or olive green enamel.

Table Bulletin Boards



Particularly suited for use with an exhibit or where wall space is limited. They may be placed on a table, on low shelving, window sill or desk. Most satisfactory for display purposes —slightly tilted at an angle— cork surface.

Name Holders and Handy Signs

This Holder is made of a solid piece of wood. A metal holder with celluloid cover into which a name card or sign may be inserted is mounted on each of its two sides. Cards may be readily inserted or removed.

The Multitext Displayer

Increases the circulation of books by featuring individual volumes. Substantially made—light in weight. Holder on the base of Displayer permits the attaching of attractive texts such as "An Old Favorite," "Read Before You Travel," "The Mystery Story," etc. Twenty texts furnished with each Displayer.

C. S. HAMMOND & COMPANY, INC.

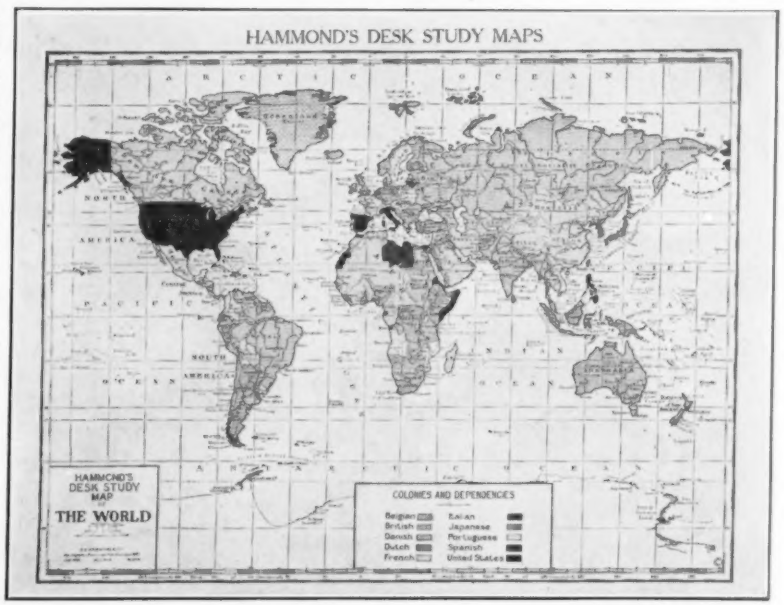
Map Engravers, Printers and Publishers since 1900

NEW YORK BROOKLYN BOSTON

General Offices and Manufacturing Department

360 Furman Street, Brooklyn, N. Y.

HAMMOND'S DESK STUDY MAPS



These maps, 8½ x 11 inches in size, are printed in full colors on five-ply cardboard with Study Helps and Suggestions on the reverse side. The maps are reproductions on smaller scale of a well edited series of wall maps, thereby making in reality a wall map on each pupil's desk. The maps show political subdivisions in colors, railroads, steamship routes with distances, principal cities and towns.

Their use insures the active participation of every member of the class. Instead of one pupil pointing out the geographical features on a wall map, all the children simultaneously do the work and secure the benefit of this visual instruction. The maps are serviceable, too, in reading travel stories, geographical readers and historical works, and in following current events. Using these Desk Study Maps to supplement so many different studies has an added advantage in teaching the pupils that maps are guides and that they do not pertain exclusively to geography.

For tracing and for work on outline maps, the Desk Study Maps are vastly superior to the maps in the text books because they lie flat and occupy less space.

The Study Helps and Suggestions

These Desk Study Maps are unique in that they present more than mere facts—the Study Helps and Suggestions printed on the back of the card stimulate the initiative, guiding the thought and encouraging map reading. This material has been especially compiled to conform with modern methods of teaching by Dr. Stephen B. Gilhuly of the Newark, New Jersey, Schools and Miss Matilda Frank, a member of the New Jersey State Monograph Committee on Geography. They have prepared these data along lines that they have found exceedingly productive of results in the class room.

Desk Maps Are Inexpensive

These handy, attractive and durable cards are more economical to use than an expensive and cumbersome book. An entire class can be equipped at but small cost and on account of the heavy cardboard on which they are printed, the maps will far outlast those in the text book. In fact, the use of the Desk Study Maps prolongs the life of the text books. Furthermore, the question of replacements because of geographical changes is solved economically by these Desk Study Maps. Maps become obsolete quickly in the rapidly changing world in which we live, and down to date maps can be secured from time to time at a fraction of the cost of new text books.

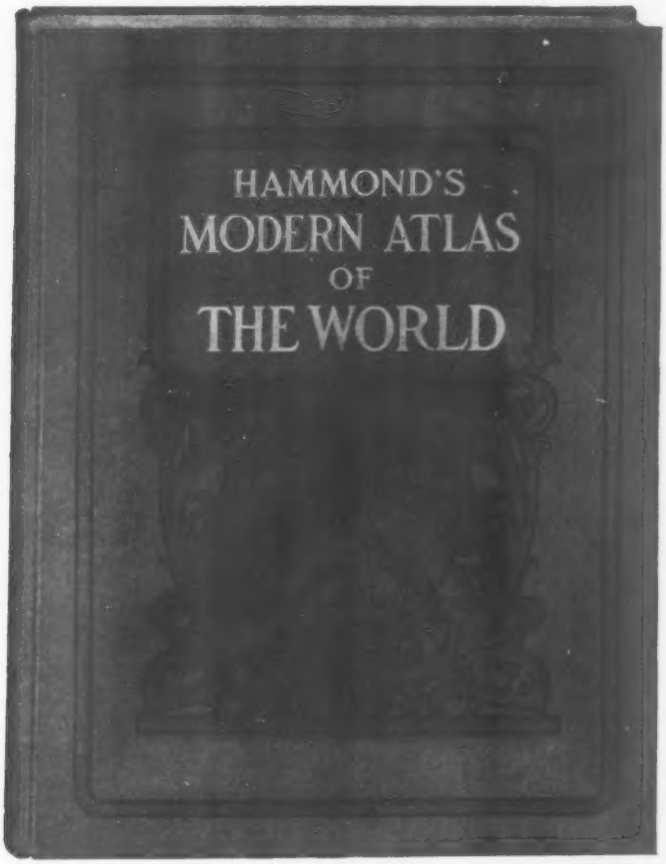
MAPS IN THE SERIES

Each 8½" x 11"

1. World on Gall's Sterographic Projection
2. Eastern Hemisphere
3. Western Hemisphere
5. North America
6. United States
7. Canada
8. West Indies and Central America
9. South America
10. Europe
11. Asia
12. Africa
13. Australia
14. Pacific Ocean
15. New York
16. Pennsylvania
17. New Jersey

PRICE....TEN CENTS EACH

For Teachers' Reference



HAMMOND'S MODERN ATLAS OF THE WORLD

This is an excellent atlas for home use. It contains:

48 Pages of Maps of Foreign Countries	3 Pages of Aviation Maps
80 Pages of State Maps	3 Pages of Gazetteer Index
16 Pages of Physical and Economic Maps	45 Pages of Index and Population matter

The political maps of foreign countries, generally 8 x 11 inches in size, include separate plates for each European country, from two to six maps for each of the other continents, and individual maps of the Canadian Provinces. The forty-eight states of the United States occupy eighty pages because densely populated ones have from two to four pages devoted to them. The physical and economic maps are a source of valuable information. The indexes give latest population figures for all the cities and towns of the United States having 100 or more inhabitants, and for the principal Canadian and foreign cities.

SIZE: CLOSED, 10½ x 12½ INCHES 194 PAGES
BINDING: RED CLOTH, STAMPED IN SILVER

PRICE $2.50

Send for Catalogs of School Maps and Globes

THE AMERICAN SCHOOL AND UNIVERSITY

IRWIN SEATING COMPANY

(FORMERLY STEEL FURNITURE CO.)

Grand Rapids, Michigan

SCHOOL DESKS AND CHAIRS

School men everywhere hail the new improved Irwin Seating Company desks and chairs as outstanding values. Boards of Education do not figure depreciation on a two or three-year basis. They like to specify a desk and chair that will last as long as the building in which it is placed. Thousands of the original Irwin Seating Company desks, installed a quarter of a century ago, are still giving satisfactory service. Measured in years of service, Irwin Seating Company desks, we claim, cost less to buy than any other desk made.

Our booklet, "Modern School Seating," contains a large variety of school desks and chairs to meet varied requirements. Different localities and different conditions require different equipment. Whatever type your schools require, Irwin Seating Company can furnish it.

NO. 192 MOVABLE CHAIR DESK

NO. 192 MOVABLE CHAIR DESK

This is the finest development of the Movable Chair Desk. Its attractive design and correct proportions recommend it to the careful buyer.

The framework is of steel construction, riveted throughout and therefore absolutely rigid. All wood parts—seat, back slats and desk top—are of plywood construction attached to the framework with Parkerized rustproof bolts and rivets. The book drawer under the seat is provided if required. Finish on the wood parts is School Furniture Brown, and metal parts Green Enamel. The Desk Top has four adjustments for height of ¾" each.

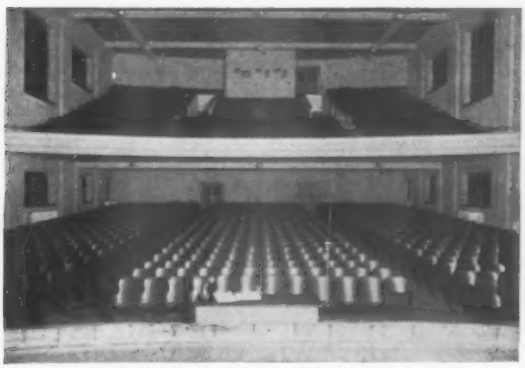
NO. 2125 ADJUSTABLE DESK AND CHAIR

NO. 2125 ADJUSTABLE DESK AND CHAIR (Shown at Left)

This is the finest type of fixed classroom seating. The desk is formed of unbreakable T-steel standards so constructed as to adjust easily yet positively and at the same time remain very rigid. Standard School Furniture Brown is used for the lacquer finish on the wood parts, and Standard Green Enamel for the metal parts.

KINDERGARTEN CHAIRS NOS. 198-B, C AND D

These chairs are made in three sizes. Being the most durable kindergarten chairs made, they are the most economical in the long run. The frames are of steel, so the chairs are strong yet sufficiently light to permit their being easily moved about. Riveted construction is used throughout. They are especially designed for use with our steel kindergarten tables illustrated and described in our latest catalog of Modern School Seating.



ROOSEVELT JUNIOR HIGH SCHOOL,
OKLAHOMA CITY, OKLA.

UNIVERSITY OF REDLANDS,
REDLANDS, CALIF.

KINDERGARTEN
CHAIR NO. 198-C

A copy of the illustrated booklet, "MODERN SCHOOL SEATING" will be sent to any interested school executive

MOVABLE DESK NO. 164-W

Attractive design combined with the most advanced ideas in correct posture and construction definitely establish this combination movable unit as the leader in its field. The base is of sufficiently large area to provide a rigid and vibrationless desk. Large smooth gliders provide noiseless contact with the floor and reduce to a minimum the marking of fine floors. Adjustments in height are simply and easily made. Wood parts are of selected close-grained hardwood, finished in the approved School Furniture Brown. A water-resisting pyroxylin sealer and finishing coats of genuine lacquer provide a fine surface that is not easily scratched. Metal parts are finished regularly in green enamel, though other attractive colors are available without additional cost. This model is made in three sizes, also with steel or wood book box.

SEATING FOR THE SCHOOL AUDITORIUM

Seating for auditorium purposes must fulfill exacting requirements: It must conform to the architectural design of the building, it must be adapted to the use intended, it must have strength and durability, and, above all, it must be comfortable. The Irwin Seating Company's auditorium chairs are obtainable in a wide variety of pleasing designs, with or without upholstery.

Inasmuch as the installation of auditorium seating is often a complicated problem, the Irwin Seating Company maintains an expert planning staff to advise its patrons concerning such perplexing problems as spacing, balcony contours, converging rows and obstructions. This service, given without extra charge, insures against wasted floor space and costly delays in installation.

MOVABLE DESK
NO. 164-W

METAL OFFICE FURNITURE COMPANY

STEELCASE
Business Equipment

DESKS — FILING CABINETS
DISPLAY CASES — SECTIONAL CASES

Grand Rapids, Michigan

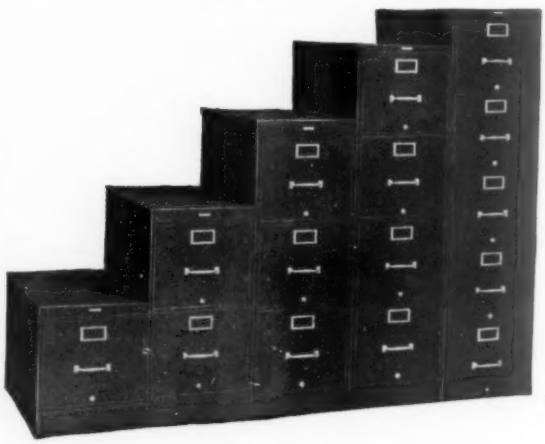
DESKS

DESKS

Steelcase Desks are adaptable for every purpose in universities, colleges and schools. The line is complete—a desk for every need—flat top desks, typewriter desks, special desks, executive type desks, office tables, laboratory tables, student desks. Built of steel to withstand hard usage, unaffected by atmospheric conditions, impervious to chemicals, Steelcase Desks afford unfailing efficiency and permanent satisfaction.

FILING CABINETS

Strength, rigidity, enduring beauty, adaptability—these are Steelcase attributes. The Steelcase line of filing equipment has been designed to give unlimited service. Exceptionally easy and quiet operation of drawers, patented features of steel construction, attractive and permanent finishes, all these are reasons for the selection of Steelcase. Clean-cut lines and correct designs make these files match the finest furniture.



DISPLAY CASES

Specially designed Steelcase exhibit cases installed in the Pathological Laboratory of the University of Michigan.

SPECIAL WORK

In the majority of cases, the requirements of educational institutions can be supplied from stock Steelcase equipment. There are always, however, problems that can only be satisfactorily met with specially designed equipment. Our wide experience in the designing and manufacture of special equipment is at your service.

A competent engineering and drafting department will work out your problems, submitting details, blueprints and estimates for your consideration. We maintain special representatives who are qualified to plan and design equipment for the particular needs of educational institutions.

METAL OFFICE FURNITURE COMPANY

TERRELL DIVISION

STORAGE CABINETS — WARDROBES
LOCKERS — SHELVING

Grand Rapids, Michigan

STORAGE CABINETS

Books, records, supplies, stationery—material too valuable to be left unprotected on open shelves—can best be stored in Terrell Steel Cabinets, behind the protection of locked, steel doors, away from the eyes of the curious, safe from petty pilfering, free from dust and rodents.

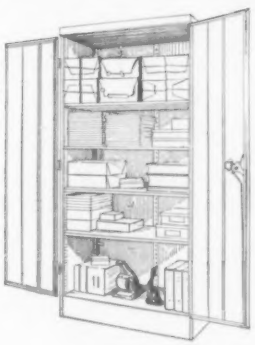
Made of heavy, high-grade furniture steel, Terrell Cabinets are rigidly built to assure a lifetime of service. They do not wear out, depreciate or get out of order.

LOCKERS

SHELVING

Terrell's Library Type Steel Shelving has been especially designed for book storage in libraries, colleges and schools. Years of experience in the design and manufacture of heavy-duty steel shelving for commercial purposes have enabled us to incorporate in steel book shelving many features and improvements. The result is a light, easily handled, quickly adjustable steel shelving, built on the unit principle, which may be added to, rearranged or moved without special tools.

STORAGE CABINETS



LOCKERS

Terrell's Steel Lockers give permanent satisfaction. They are strongly built of heavy steel, capable of withstanding abuse, and remain in perfect operating condition without constant attention. Attractive in design and appearance, Terrell Lockers are preferred where quality is considered.

Terrell's Lockers are made in a variety of sizes and styles and are adaptable to every purpose. Especially suitable for colleges, schools and gymnasia, where space is limited and a large number must be accommodated.

SHELVING

RCA VICTOR COMPANY, INC.

CENTRALIZED RADIO SECTION

A Radio Corporation RCA *of America Subsidiary*

Camden, New Jersey

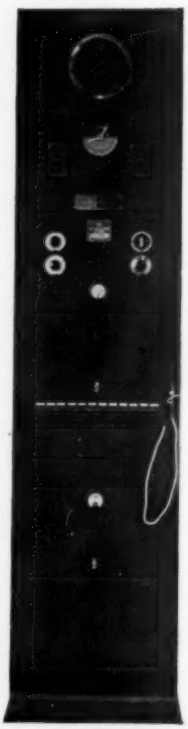
"RADIO HEADQUARTERS"

THE MODERN TEACHING AID FOR MODERN SCHOOLS

. . . RCA Victor Centralized Radio

Here's the modern-day method adopted by modern schools for teaching by radio . . . for listening in on important radio lectures . . . for hearing symphonic and other musical programs . . . for making announcements to teachers and students . . . for signaling drills . . . for emergency instructions . . . for phonograph record entertainment in any or every classroom!

RCA Victor Centralized Radio provides for a single receiver, and for a loudspeaker in as many rooms as you require. By adding simple receiving units, you can command as many as four different programs at one time and each room can take its choice. Each room has a volume control and a program selector. Loudspeakers, neat and unobtrusive, can be built into the walls.



The operation of RCA Centralized Radio Equipment is very simple. The incoming program is distributed to any desired parts of the building through the distribution board located on this panel

The central control panel can be installed in the principal's office, or in any other part of the building. A microphone enables the principal, teachers and visitors to talk to any group of classrooms at any time.

The apparatus is designed to require a minimum of attention from the operator. No batteries or charging equipment are required, as RCA Victor Centralized Radio is built for lighting circuit operation.

Provision is also made for an automatic phonograph unit, which plays any type of record, including the new long-playing Victor Records that play fifteen minutes on each side. You can have 2½ hours of recorded instruction or entertainment without touching the apparatus or changing a record.

This equipment has been designed by the world's foremost group of radio and sound engineers, for installation in present or new buildings, and has proved its great capabilities not only in the RCA Victor laboratories but also in many of the nation's best known schools and universities. Correspondence is invited on any type of standard or special installation.

A typical RCA Loudspeaker for Centralized Equipment. One of these is built into the wall in each classroom.

RCA VICTOR COMPANY, INC.

PHOTOPHONE DIVISION

A Radio Corporation RCA *of America Subsidiary*

Camden, New Jersey

"RADIO HEADQUARTERS"

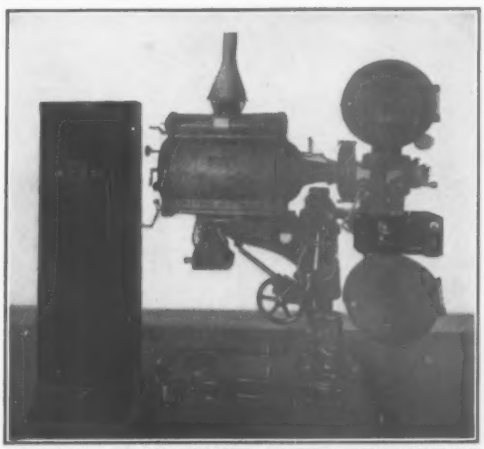
For the Progressive School and University
RCA Victor PHOTOPHONE
Sound-on-Film Instruction in the Modern Way

1. FOR PERMANENT INSTALLATIONS

RCA **Victor** Photophone Sound Reproducing Equipments are available to accommodate any auditorium from the smallest to over a million cubic feet—for seating capacities from a few hundred up to four thousand persons.

RCA Victor Photophone Sound Reproing Equipments are designed for use with any of the leading makes of projectors, such as Powers, Simplex, Fulco or Kaplan, and are recognized as standard throughout the Sound-Movie Industry.

Thousands of **RCA Victor Photophone** installations are already in use in all parts of the world.

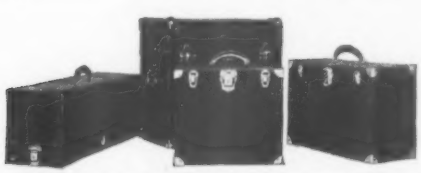


RCA Victor PHOTOPHONE SOUND REPRODUCING EQUIPMENT FOR PERMANENT INSTALLATION

2. FOR PORTABLE APPLICATIONS

In Class Rooms, or for other locations where no preparations are available. **RCA Victor Photophone** Portable Sound-Movie Equipments are furnished, complete with Projector, Amplifier and Loudspeaker, ready to set up and operate on a moment's notice.

These Portable **RCA Victor Photophone** Equipments are available in two types—one designed for 35 mm. Standard Sound-on-Film, and the other for 16 mm. Sound-on-Film.



RCA Victor PHOTOPHONE PORTABLE SOUND-MOVIE EQUIPMENT

A wide variety of educational subjects are already available, and many more are continually in preparation.

THE AMERICAN SCHOOL AND UNIVERSITY

SAMSON ELECTRIC COMPANY

Manufacturers Since 1882

Main Office: Canton, Mass.

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CENTRALIZED SOUND SYSTEMS FOR SCHOOLS AND UNIVERSITIES

The Samson Electric Co., designers and manufacturers of school centralized sound systems of the rack and panel and table types in operation in hundreds of schools today, announces a new dual type known as the PMR JR. 25.

PMR JR. 25 or 50

This new low-priced dual type system reproduces with great fidelity a radio program, phonograph record or announcement from microphone with sufficient volume for classrooms, auditoriums, gymnasiums or cafeterias.

At all times the Principal can make announcements to all rooms—even when the teacher has turned off the reproduction at the local control in the room. Volume under these conditions is shown by a neon bulb, visual monitor.

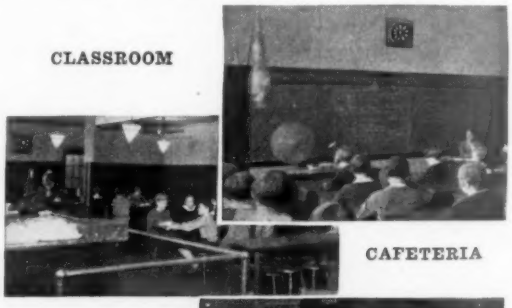
PRINCIPAL ANNOUNCES ANY TIME

NO ATTENDANT NEEDED

More time can be devoted to teaching by users of Samson Junior PMR 25 or 50 systems as the local control eliminates the need of constant attention at switchboard.

The Junior PMR 25 for schools of twenty-five rooms or less and the Junior PMR 50 for those of fifty rooms or less consist of a radio set, power amplifier, microphone amplifier, electric phonograph turntable, pickup and control panel —all A. C. operated, no batteries whatsoever required, and enclosed in lockable oak cabinet to harmonize with school furniture, complete with tubes, monitor loud speaker, microphone and stand. For larger schools we recommend our rack and panel equipment.

CLASSROOM



CAFETERIA

GYMNASIUM

AUDITORIUM

Because hundreds of Samson centralized sound systems are in use in schools and our electrical manufacturing experience covers fifty years, we can guarantee you the maximum of service and dependability.

In order to secure best results, be sure in your choice of a school sound system that the integral parts and accessories are designed by one manufacturer as is the case with the Samson Junior PMR system.

LOWEST COST PER ROOM

A representative system for a school of 25 rooms would be $1500 installed complete.

An illustrated bulletin fully describing this new Samson system will gladly be sent upon request.

CENTRALIZED "RACK AND PANEL" AMPLIFYING EQUIPMENT

Samson Amplifying Equipment receives programs (from radio broadcasts through its receiving set, addresses through its microphone, and records through its motor-driven phonograph) which are amplified, and distributed to any or all rooms in the building or to other buildings, and there faithfully reproduced by its loud speakers for an audience of any size.

SCHOOL EXECUTIVES SUPPLIED DESIGN DATA AND AFTER USING HEARTILY RECOMMEND

A national survey of school executives supplied design data for Samson centralized schoo' amplifying equipment. Scores of principals or superintendents after using a centralized school system report it has made large contributions to the general administration of their schools, some even calling it, "A unifying, time-saving, efficiency-promoting instrument of administration."

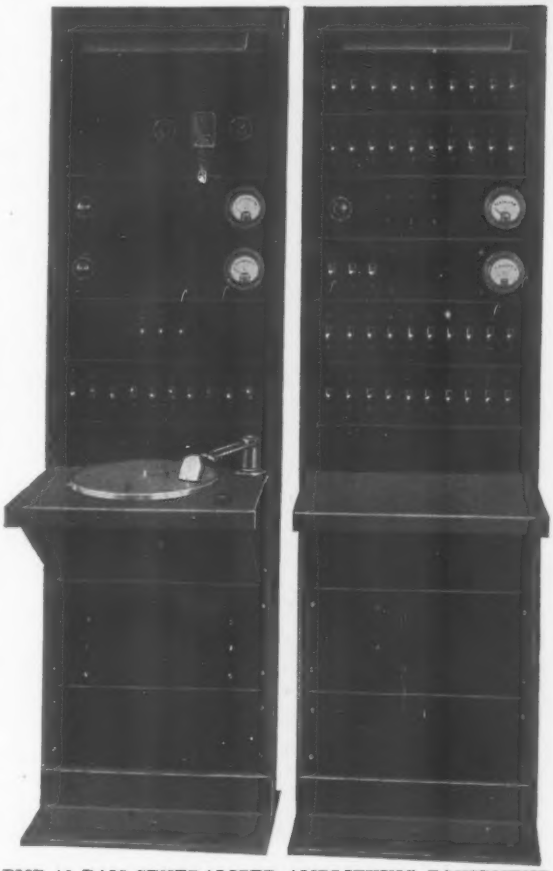
PRINCIPAL SPEAKING

RECORD

RADIO

USES IN SCHOOLS

These systems are used for general announcements by principal, faculty or pupils, for music appreciation hours, accommodating overflow meetings, auditoriums, and supplying music for parties and dances; for distributing radio programs, phonograph recordings, or speeches and talks to given rooms; routine announcements; talks on school spirit, enterprises and discipline, study habits, first-aid, safety, appreciation of art, and patriotic or special day subjects; and for classroom instruction in music.



PMR-40 PAM CENTRALIZED AMPLIFYING EQUIPMENT

PAM EDUCATIONAL DISTRIBUTING SYSTEM

Is completely operated from the A. C. lighting circuit, absolutely eliminating all batteries and their care; can be added to without scrapping any part of the original purchase; is built to underwriters' standards; **permits delivery of any program to any room or rooms** without cross-talk being heard in rooms not supposed to receive the program; has same volume when one speaker is operating as when all are; has volt meter, voltage regulating device so operator can see that correct voltage is supplied and thus lengthen life of tubes and all apparatus; and is equipped with "visual monitor" allowing volume to be kept at desired level without use of general monitor speaker. **Send for "PAM, THE NEW VOICE IN EDUCATION."**

PRIVATE TELEPHONE SYSTEMS

We have specialized for more than thirty years in the design and manufacture of telephone equipment for schools. **Literature will be promptly supplied on request.**

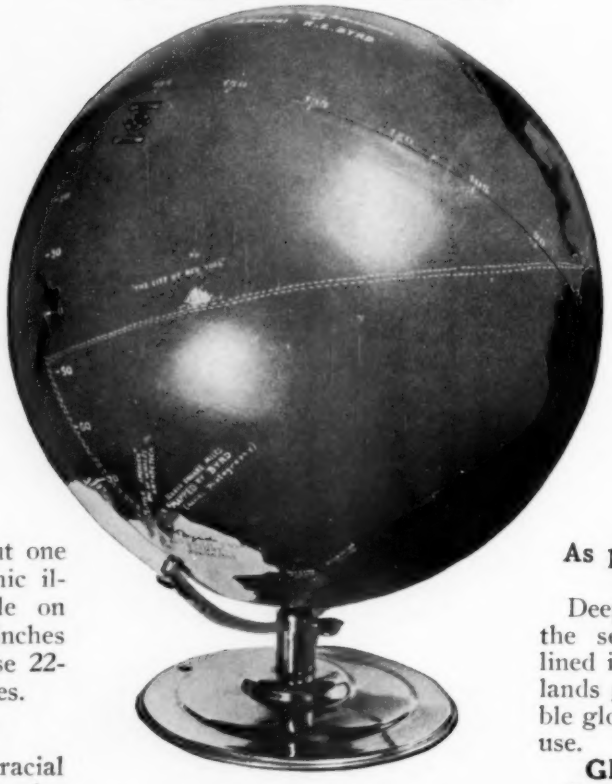
THE AERO GLOBE COMPANY

CREATORS MANUFACTURERS DISTRIBUTORS

of the AERO GLOBE

29 Cobbs Hill Drive, Rochester, N. Y.

An AERO GLOBE Personally Autographed by Admiral Byrd



Illustrating an Explorer's Accomplishments Projected in Removable Water Color Paints

The above is but one of countless graphic illustrations possible on the 1520 square inches of surface on these 22-inch all metal globes.

HISTORY

From primeval racial distribution thru colonial expansion to world war situations and results, hundreds of events in history may be graphically shown with chalk, ink, water color paint, or modeling clays. Each project may be removed with a dry, or damp, cloth to make way for the next.

CONSTRUCTION

The sphere is spun of 16 gauge aluminum and mounted on an arm and base of cold rolled steel-chromed surface.

Paint surface of globe guaranteed satisfactory.

Aero-Globes stand on desks, or on tripods, or hang from a screw in the wall.

As practical as it is beautiful

Deep blue paint for the seas — black (outlined in orange) for the lands give a 100% visible globe for class room use.

GEOGRAPHY

True land shapes and sizes as well as distance conceptions are involuntarily fixed; confusion from the study of distorted flat world maps is counteracted where the Aero Globe is installed.

Class room journeys to distant lands, lessons in latitude, longitude, time, ocean currents, climate, etc., are made simple when *drawn* on this globe where no extraneous reference material conflicts. Wonderful for projects on the distribution of products.

Highly Endorsed

The highest recommendations for this globe are given by teachers who have learned to enjoy its great teaching possibilities.

Write for list of installations and prices

THE AMERICAN SCHOOL AND UNIVERSITY

ALJO MANUFACTURING CO.

130 West 21st Street

New York, N. Y.

ALJO

REG. U.S PAT OFF.

The ALJO Line Includes:

Batik Dyes
Fresh Flower Colors
Dried Flower Colors
Artificial Flower Colors
Flower Bleach and Fire Proofing
Dry and Pulp Colors
Scenic Artists' Supplies
Aniline Dyes
Bronze Powders
Poster Colors
Scenic Brushes

Of the above products, Art Departments in the higher grade schools and colleges are now making considerable use of our Batik Dyes and Poster Colors, and an ever-increasing number are using our Scenic Colors in the designing and painting of their own scenery for plays, pageants and other functions.

ALJO Batik Dyes

Batik Dyeing and Painting has now become one of the most popular subjects covered in the Art Departments of our high schools and colleges. The Board of Education of the City of New York, after thoroughly examining and testing ALJO Batik Dyes, have adopted them as the most successful and economical dyes for this work. A majority of the commercial Batik concerns are also using ALJO Batik Dyes exclusively, being convinced that these dyes are in every way most suitable for their purpose.

ALJO Batik Dyes are the practical result of ten years of daily experience in direct contact with artists, instructors and students of this line of art, in the course of which we were enabled to study the requirements that were most suitable and to make the selection of colors that would best conform to the nature of the work required.

Let us send you our circular containing a list of the colors, also the various sized packages and prices. A color card and any further information desired will be mailed on request.

ALJO Scenic Colors

Owing to the demand for Scenic Colors received from high schools, colleges and institutions, we have found it necessary to establish a special Scenic Color Department with a complete line of all supplies and colors used for this work.

The interest of school and college audiences is greatly increased by the knowledge that the students themselves have designed and painted their own scenery, and the work is greatly enjoyed by students having artistic ability. For this purpose colors of distinct character, brightness and quality are essential. ALJO Scenic Anilines have a brilliancy and effectiveness which highly commends their use for this work.

Lists of colors and supplies, with prices and other information, will be sent at the request of any school or college official or art department.

ALL-STEEL-EQUIP COMPANY

Incorporated

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Steel storage, filing, and wardrobe cabinets; steel lockers; steel shelving, steel transfer cases, card cabinets, drill cabinets, typewriter tables, stacking boxes, and steel shop equipment. Every need in this type of product—for classroom, office, shop, etc.—can be provided. The important schools using A-S-E equipment are the best endorsement.

All-Steel-Equip is a long established, successful national concern providing an intelligent consulting and design service. Branch offices offer a complete follow-up service. Write today for new General Catalog.

"Master" Storage Cabinet 36" Wide, 18" Deep, 78" High

CABINETS

Two complete lines of cabinets. The "Master" line provides the finest construction features and appearance on the market. The "Popular" line consists of good-looking, well-built cabinets—offering maximum value for very moderate cost.

A-S-E lines provide 52 models—storage, wardrobe, combination, desk-high, and other cabinets for every school use. Body of selected steel—members strengthened by flanging or embossing. Doors are heavy gauge steel with panel reinforcement. Handles are modern design vault type, chromium plated. Shelves easily adjustable. Baked on enamel base coat with two coats of high-grade, hand-sprayed lacquer. Choice of colors. Cabinets available in wide range of sizes.

"Popular" Wardrobe Cabinet, 36" Wide, 18" Deep, 78" High

"Master" Desk High Cabinet. 18" Wide, 20" Deep, 30" High. Two Adjustable Shelves

Type 9000 Single-Tier Lockers

LOCKERS

A-S-E lockers provide clean, safe, fire-resistant storage space for clothing. Construction is rigid. Moving parts are few and simple. Doors 1/16-inch hard steel—double flanges full length. Hinges have non-removable pins. A-S-E Lockers withstand years of daily use and abuse. Finished with two coats of baked-on enamel—fronts sprayed with lacquer by hand. Dark green color—French gray or other colors supplied to order. Single-tier lockers are particularly suited for school corridors. They provide maximum room for hanging clothes full length. When floor space is limited, or clothes stored a short time, A-S-E Double-Tier Lockers are preferable.

Type 9001 Double-Tier Lockers

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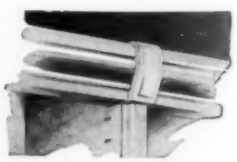
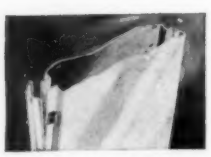
A-S-E provides shelving for use in classrooms, school libraries, etc. Patrician book shelving is undoubtedly the finest of its type—yet cost is small. Used as single bookcase or in long rows holding thousands of books.

Three heights—66, 78, 90 inches overall; single-faced or back-to-back types, and a variety of beautiful finishes. All construction is flush. No bolt heads or sharp corners. Shelves easily and solidly adjusted. Each section has base 6 inches high, closed all around for cleanliness. Finish of baked-on enamel—with two coats of high-grade lacquer. Wood finishes or attractive color tones available.

Patrician Shelving, in Single Units or Large Installations



Detail Showing Cornice, Molding, and Corner Piece. Observe Handsome Appearance



Detail Showing How Finishing Ends, Sides and Molding Are Joined without Exposed Bolts

AMERICAN SEATING COMPANY

Makers of Fine Seating for Schools, Churches and Public Auditoriums

General Offices: Grand Rapids, Michigan

BRANCHES IN ALL PRINCIPAL CITIES

BIG THINGS

Can Be Accomplished with LIMITED School Budgets

Note how the Wilmette Public Schools maintain modern equipment . . . and do it economically

Mr. J. Robb Harper is superintendent of the Wilmette, Illinois, Public School System—comprising 4 schools with a total of 52 classrooms.

Mr. Harper, with a full realization that his schools, to keep step with teaching progress must provide *modern, efficient* equipment, has established an annual improvement program that has been highly successful.

Mr. Harper says:

"My budget has always carried an item for New Developments, so that the Wilmette Public Schools can maintain their high standards in offering modern schooling with modern equipment. With a full realization that good health is vital to the pupils' progress we have almost without variation applied 50% of our New Developments appropriation to new seating. Thus each year a number of rooms are brought up to the most efficient seating standards with American Universal Movable Desks. So that each year some of our classrooms are made new, and the penalties of obsolete seating are eliminated. For a relatively small annual expenditure in comparison to the total cost of education, we are enabled to give our students seating that is posturally correct and a definite aid to their health and efficiency."

To meet diminishing income, where *new school building* may not be possible, your school can be renewed economically and brought up to standard by conservative investment in modern seating.

Modernize with American Universal Desks

When you seat your classrooms —one room or every room—be sure you obtain the greatest VALUE for your appropriation. Install seating that is recognized for its contribution to pupil health and efficiency as well as a quality product from every viewpoint of the workmanship and materials employed in its construction.

The American Universal Desk is scientifically designed to induce good posture—to make erect sitting natural and comfortable—to prevent slumping which crowds vital organs. It has features that definitely assist in sight conservation—and other important improvements for the physical and mental welfare of the student. Years of experience and scientific research are behind it. The detailed facts are yours for the asking.

Free Classroom Posture Poster and Authoritative Seating Booklets (They contain no advertising)

Send for free three-color posture poster, size 17½ by 25 inches which shows children why they should sit *erect*. Teachers, principals, or superintendents will be supplied with a poster for each classroom on request. With them, too, any of the following authoritative, instructive and interesting booklets: *"Essentials of Hygienic Seating,"* which shows what constitutes good and bad posture, the relation of seating to posture, adjustment of seats, desks, and lighting and seating arrangements . . . *"Ideals and Standards of Classroom Seating,"* covering the essentials of good seating and the grade distribution of school desk sizes . . . *"The Relation of Posture to Tuberculosis"* . . . *"The Buying of School Equipment"* . . . and *"Forty Years of School Seating."* When you write, please indicate the booklets you wish.

Correspondence

is invited concerning seating and tables for library use as well as furniture and seating of appropriate character for the church, lodge, theatre—hand carved plaques, memorials, and carved cabinet work for residences and libraries.

ARMSTRONG CORK COMPANY

929 Arch Street, Lancaster, Pa.

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Boston
Chicago
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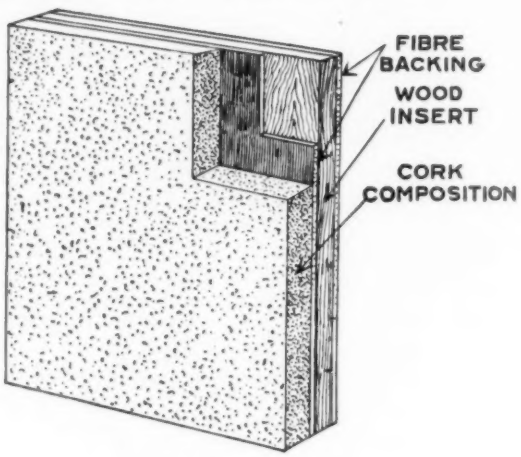
San Francisco

ARMSTRONG'S CORK BULLETIN AND TACK BOARDS

Schools throughout the country have found Armstrong's Cork Bulletin and Tack Boards to be ideal in every respect for posting bulletins and mounting pictures, specimens, charts, etc.

The special cork composition from which they are made lets thumb tacks go in easily and permits their removal without the use of a tack puller and with no danger of broken finger nails. Yet the tacks are held securely until purposely withdrawn.

The soft resilient cork closes up the holes made by tacks. Thus, the boards do not become scarred nor will they splinter or crack. When necessary, they can be washed easily with mild soap and lukewarm water.



Types and Colors

There are two types of Armstrong's Cork Bulletin and Tack Boards: wood-backed and burlap-backed. The wood-backed material is composed of a layer of burlap-reinforced cork composition, ¼-inch thick, cemented securely to a backing of ¼-inch three-ply wood insert compo board, giving a total thickness of ½-inch. Burlap-backed material differs from the board-backed in that it does not have the compo board reinforcing. It is ¼-inch thick.

Wood-backed boards are supplied in standard panels 4-foot x 6-foot. Smaller boards or strips can be sawed easily on the job from standard panels, or they will be supplied by the factory. Larger sizes are furnished in sections. Burlap-backed material is made in a single piece of any desired length and in any width up to 6 feet.

Armstrong's Cork Bulletin Boards are supplied in three colors—light brown, dark brown, and green. They can be installed by any carpenter.

ARMSTRONG'S CORK BULLETIN BOARD IN THE KINDERGARTEN OF GREENFIELD GRADE SCHOOL, PITTSBURGH, PA.

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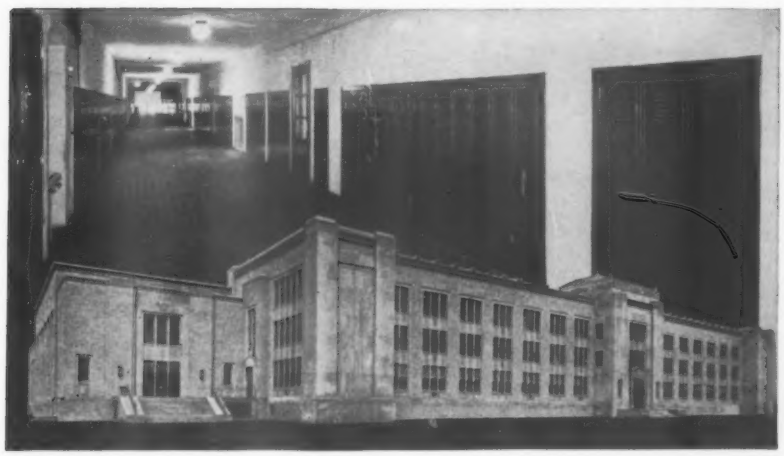
Complete information about any of these Armstrong Products will be sent on request.

THE BERGER MANUFACTURING CO.

Division of Republic Steel Corporation

Canton, Ohio

BRANCHES AND DEALERS IN PRINCIPAL CITIES



Above: Second floor installation of Berloy Recessed Steel Lockers at New John Marshall High School, Cleveland, Ohio. Inset: John Marshall High School. George M. Hopkins, Architect; Crowell & Little, Contractors.

MORE than a million Berloy Steel Lockers in use indicates strong preference on the part of buyers of school equipment for Berloy Products.

Berloy Steel Lockers are built of finest materials, scientifically designed and handsomely finished . . . strong, rigid, durable. One-pieced doors are heavily reinforced on the inside. Rubber bumpers at top and bottom of locking bars contribute to quiet operation. The never-failing locking mechanism is simple yet secure.

For 45 years Berloy has been an extra-dependable source of supply for steel equipment of every type . . . standard or special. Without obligation, Berloy experts will help you plan an economical installation.

BOOKSHELF UNITS FOR ECONOMY IN SPACE AND COST

BERLOY FILING CABINETS ARE MADE IN ALL STANDARD SIZES AND TYPES

STORAGE CABINETS THAT SAVE TIME AND MATERIALS

Steel Desks
Steel Tables
Filing Cabinets
Steel Lockers

BERLOY

Steel Shelving
Storage Cabinets
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Special Equipment

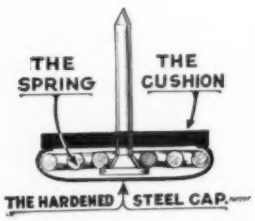
BUCKEYE GLIDE COMPANY, INC.

125 East 23rd Street

New York

BUCKEYE SPRING-KUSHION NOISELESS GLIDES

For School Chairs, Desks, Tables, etc.



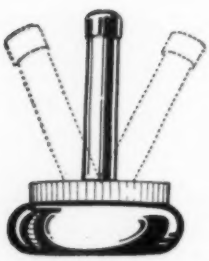
Patented spring construction, non-rusting, specially processed steel (the only glide that will stand a continuous file test), explain **Buckeye** satisfaction and long life.

Replacing worn glides is expensive; so is chair wear due to strain in movement of chairs not equipped with glides; and silence in chair and desk movement is at all times desirable in classroom or cafeteria.

Buckeye Glides last for years, are silent on wood, terrazzo and all other floors, add 20 to 40 per cent to the life of the chair, and thus represent real economy.

Test a set of Buckeye Glides on your chairs at our expense.

MAKE CHAIRS QUIET!



TYPE P

TYPE A
ANTI-WOBBLE
Adjustable height

TYPE B
For metal furniture

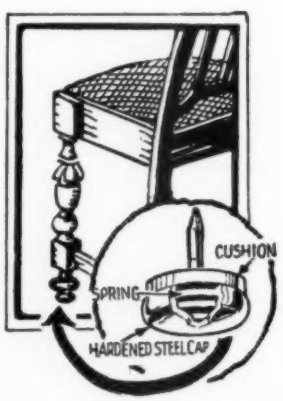
TYPE N

Buckeye Spring-Kushion Glides are made in two sizes to cover the whole range of general use:

No. 136—⅞" diameter—for chairs, light and medium-size tables and medium-weight furniture generally.

No. 206—1¼" diameter—for heavier pieces such as settees, heavy desks and large tables, etc.

No. 206 is also recommended for use on cork or soft linoleum floors, or wherever an increased bearing surface is needed to prevent denting.



Ride Your Furniture
on
Spring-Kushion Glides
Always Quiet
Even on Stone Floors
Save Wear and Tear
On Chairs
On Tables
On Floors
On Nerves

THE AMERICAN SCHOOL AND UNIVERSITY

ROBT. P. CARSEN SCENIC STUDIOS INC.

Specializing in

Designing, Constructing and Painting of Theatrical Stage Settings

Address

1507 North Clark Street
Chicago, Illinois

Robt. P. Carsen Scenic Studios Inc. specialize in equipping schools, colleges, auditoriums and theatres with all types of scenic equipment and draperies. Our line of Stage Equipment is complete, covering every possible need of the modern school stage. All our equipment is guaranteed. We also specialize in the Rental of Scenery, Draperies and Effects for both Amateur and Professional Productions.

Products

Asbestos Curtains
Scenery
Cyclorama Settings
Stage and Auditorium Draperies
Curtain Tracks
Stage Rigging and Hardware
Electrical Stage Lighting
Electrical Curtain Machines
Light and Horn Towers
Mechanical Stage Effects
Steel and Wood Folding Chairs

Stage Curtains and Draperies

Our stage Curtains and Draperies are widely known for their beauty and serviceability. Our Fire Curtains of flexible asbestos are obtainable in any required size, in plain or wire woven cloth.

Curtain Tracks

Curtain Tracks are furnished in any desired size, made of either wood or steel. These tracks are noiseless, easy to operate and install.

Stage Accessories

We furnish a complete line of stage rigging, both hemp lines and counterweight systems, also a complete line of stage hardware, and other stage accessories to cover every school stage need.

Electrical Equipment

We carry a complete line of electrical stage lighting, effects and equipment, including our electric curtain machines for remote control which are noiseless, smooth running and trouble free.

Scenery Rental

We maintain a complete Rental Department and specialize in the renting of Scenery, Draperies, Electrical Stage Lighting and Equipment for all occasions.

Folding Chairs

When we quote you on any desired type of stage scenery or equipment, we shall also be pleased to quote you prices and specifications on our Wood and Steel folding chairs for the school auditorium or other uses.

Service

Let our Engineering and Architectural Department help you solve your individual stage problems. Write us about your needs, and we will submit quotations and specifications.

Let us send you further information on any of the items mentioned on this page

J. R. CLANCY INCORPORATED

Established 1885 Incorporated 1922

Theatrical Stage Hardware

Syracuse, New York

Forty-Seven Years of Practical, Progressive and Successful Experience.

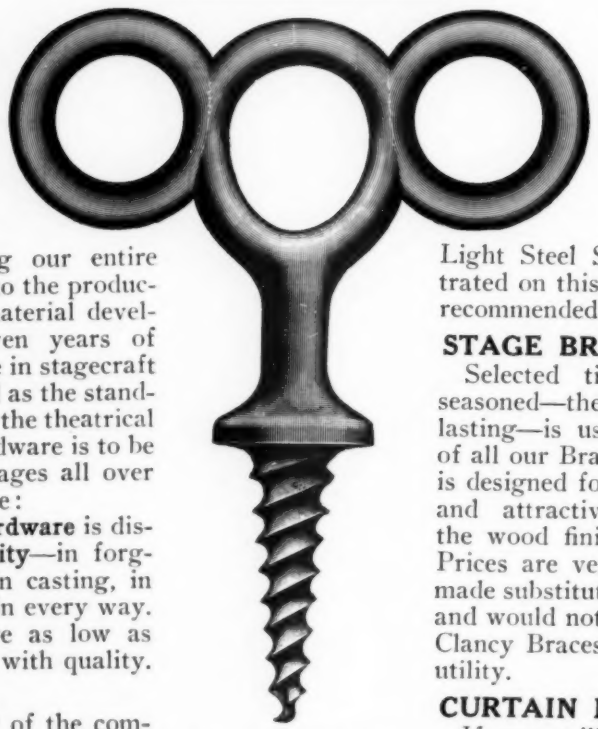
We are strictly manufacturers of the **finest stage hardware,** devoting our entire time and facilities to the production of a line of material developed by forty-seven years of practical experience in stagecraft and long recognized as the standard of perfection in the theatrical world. Clancy hardware is to be found on school stages all over the country because:

Clancy Stage Hardware is distinguished by **quality**—in forging, in stamping, in casting, in materials—quality in every way.

Clancy prices are as low as possible, consistent with quality.

CATALOG

Write for a copy of the complete Clancy Catalog, "Theatrical Stage Hardware." In its pages you will find illustrations, descriptions, prices, on all kinds of stage hardware, and in addition, many valuable hints on modern stage mechanism and its installation under all kinds of conditions.



No. 230 Light Steel Stage Screw — greatest diameter only 3/8 of an inch. This Screw is particularly economical in the saving of floors and carpets. Drop-forged, double-threaded.

The first part of the catalog describes **material for "set" scenery**—such as stage screws, braces, cleats and fittings of all kinds; the second part, **curtain rigging**—steel frame, ball-bearing curtain blocks, tension pulleys, counterweights and tracks, clews, curtain guides, wire rope fittings, etc.; the third part describes the Clancy line of **manual counterbalance rigging;** and the fourth part, **material for "hanging" scenery,** such as drop-holders, cyclorama knuckles, movable iron head-blocks, steel loft-blocks and underhang block.

STAGE SCREWS

We take great care in the manufacture of all our Stage Screws, using special tools of our own design. Our No. 230 Light Steel Stage Screw, illustrated on this page, is especially recommended.

STAGE BRACES

Selected timber, thoroughly seasoned—therefore stable and lasting—is used in the making of all our Braces; the iron work is designed for maximum utility and attractively finished—and the wood finish is in hard oil. Prices are very low. A home-made substitute would cost more, and would not compare with the Clancy Braces in durability and utility.

CURTAIN RIGGING

If you will furnish us with width of curtain opening, height of curtain opening, distance from stage floor to upper side of grid-iron, distance between side walls, thickness of wall over proscenium opening, we shall be pleased to submit a list of all material necessary for properly installing your curtain under a system demonstrated to be the utmost that can be done to insure safety in the event of a theater fire.

COUNTERBALANCE RIGGING

Clancy Side Wall Counterbalance Rigging is generally recognized as the most economical method of counterweighting curtains and scenery.

See our 64-page catalog for further information.

SPECIFY "CLANCY STAGE HARDWARE"

PETER CLARK, INC.

Stage Equipment Specialists for Over 25 Years

544 West 30th Street New York City

Products

Complete Stage equipment for all Stages, large or small, for schools, colleges, auditoriums, convention halls, theatres: Stage Rigging, Counterweight Systems; Asbestos, Rigid Steel and Soundproof Curtains; Draw Curtain Tracks; Electric Curtain Machines; Mechanical Stage Effects; Light and Horn Towers; Portable Motion Picture Booths; Portable Bleachers and Sectional Grandstands; Organ, Orchestra and Stage Elevators.

Guarantee

All equipment is sold with a full guarantee and any defects in material or workmanship will be promptly rectified.

Service

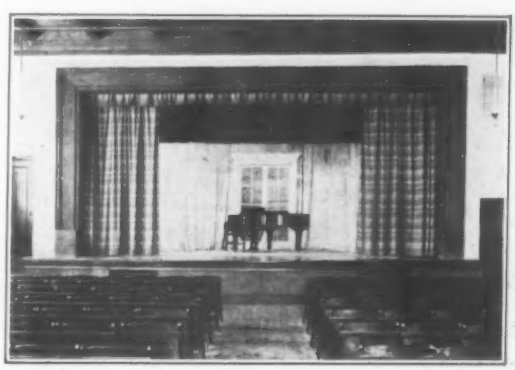
We maintain an engineering department organized to help you solve your stage problems. This service is at your disposal without obligation.

Stage Rigging and Hardware

All types for anything you want to fly, either by hemp lines or counterweight system. A complete line of stage accessories embracing every appliance needed for the modern stage

Sectional Grandstands

Made in standard sections of the tower and girder type construction of interchangeable units. They are flexible in length and height. This type can also be covered with portable flooring forming a ramped floor.



Fire Curtains

Flexible asbestos fire curtains of plain or woven wire cloth. Curtains with rigid steel frame and a layer of cloth on both auditorium and stage side of curtain. Curtains with sheet metal face and vitrified asbestos back on structural frame.

Soundproof Curtains

Used to separate gymnasiums from stage and auditoriums.

Curtain Tracks

Noiseless steel tracks for various size curtains. All tracks designed for easy hanging.

Curtain Machines

Quiet, smooth running machines for operating curtains from remote points.

Motion Picture Booths

Portable booths made of asbestos transite and angle iron for use in building without a permanent booth.

Portable Bleachers

Designed for your seating requirements. Easily handled and require minimum space for storing.

Draperies

Stage curtains and cyclorama settings of fabrics selected for both finish and service. The excellent workmanship on our curtains reflects the high type of the artisans that manufacture them.

A Peter Clark, Inc., installation Assures Faultless Operation. "Performance Counts."

THE CONRAD & WHITE SCENIC COMPANY

Manufacturers of

THEATRICAL AND SCHOOL STAGE EQUIPMENT

132 South Delaware St., Indianapolis, Ind.

PHONE: LINCOLN 9596 RENTAL SERVICE

SCHOOL STAGE EQUIPMENT

First consult with The Conrad & White Scenic Company, if you are planning the purchase of school stage equipment of any kind. This Company will not only supply you with any needed scenery, stage curtains and curtain tracks, draperies, electrical lighting equipment and lighting effects of various kinds, stage hardware and other stage accessories, but their experience will aid you in the solution of any special problems you may be facing in equipping the stage.

Scenery

We manufacture a complete line of interior and exterior settings, cycloramas, cyclorama doors, tormentors and grand drapes.

Rental

Since it is not ordinarily feasible to purchase scenery for special school or college plays, operas or other performances inasmuch as the type of scenery required varies with each production, we maintain a Rental Department, about which we shall be very glad to send you full particulars.

Stage Curtains

We furnish a complete line of all sizes of stage curtains, to operate on draw track, drape or elevate with counterweight, using velour, damask, sateen, monks cloth and other materials. Also asbestos curtains.

We also supply noiseless hardwood curtain tracks which are easy to install and operate.

Electrical Equipment

Our line of electrical equipment for school stages includes footlights, borderlights, spotlights, floodlights and color effects. Let us send you full details.

Stage Hardware and Other Accessories

Stage hardware and other stage accessories, including stage rigging (both counterweight systems and hemp lines), can be secured from our stocks at all times.

Let us know your needs, and we shall be glad to offer suggestions and quote prices.

CYCLORAMA SETTING BY CONRAD & WHITE SCENIC COMPANY

CONTINENTAL SCHOOL FURNITURE & EQUIPMENT CO.

1414 South Wabash Avenue, Chicago, Ill.

THE CONTINENTAL LINE OF SCHOOL FURNITURE

is a high-grade line—made right—at the right price. It includes: Teachers' Desks, Tables, Tablet Arm Chairs, Junior and Kindergarten Chairs, Teachers', Office and Library Chairs, and Folding Chairs. **Write for complete catalog.**

Teacher's Desk (No. 21 illustrated)

Material—Selected Plain Oak
Top—⅞" thick, solid
Drawers—Hardwood; dovetailed with 3/16" 3-ply bottoms
Legs—1¾" square tapered; steel sliding shoes; inside edges rounded
Finish—Lacquered; American School Brown or Light Golden Oak

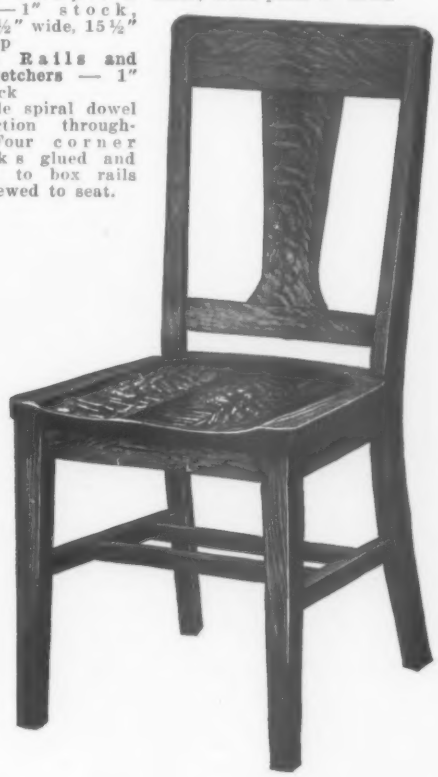
Tablet Arm Chair (No. 1 illustrated below)

This Tablet Arm Chair embraces the three most important factors in school seating: Comfort, Durability, Design.

Material—Plain Oak, with hard maple tablet arm
Arm—11¼ x 23½"; fastened to back post by 12-gauge 3-way steel brace, and to front post by 1 x 3 x 9" wood brace glued and screwed to the arm and doweled to top of post reinforced by two 2" pressed steel braces; all edges of arm rounded
Posts—Back: steam bent finished 1 x 1⅝" flared at top, rounded front to back, inside corner above seat rounded. Front: finished 1⅝" square tapered
Seat—Full saddled, especially rounded and beveled to front to relieve pressure on nerves of legs. Front 17½", back 15½", depth 16", height from floor either 17" or 18"
Lacquer Finish — In Light Oak, Dark Oak or American Brown

Teachers' Office and Library Chairs (No. 93 here illustrated)

Material—Plain or Quartered Oak and Birch
Posts—Back posts 1" stock, front posts 2" stock
Seat — 1" stock; 16½" wide, 15½" deep
Slats, Rails and Stretchers — 1" stock
Double spiral dowel construction throughout. Four corner blocks glued and screwed to box rails and screwed to seat.



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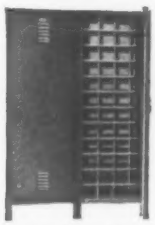

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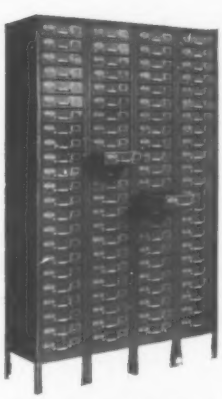

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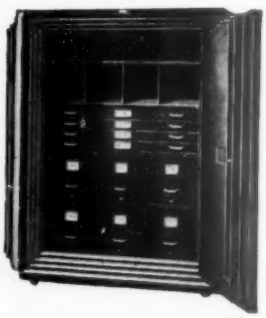

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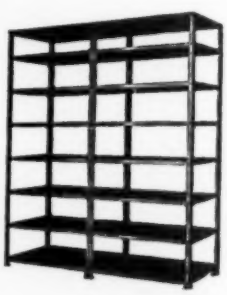

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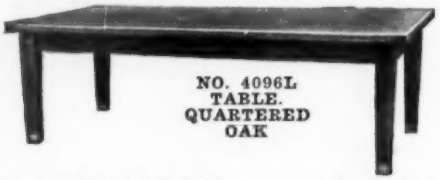

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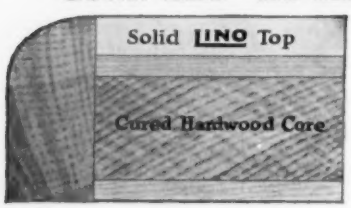

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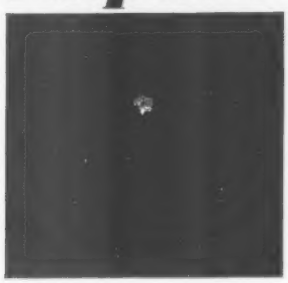

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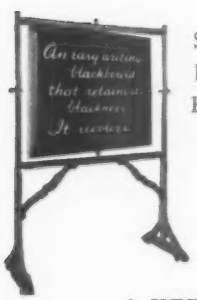

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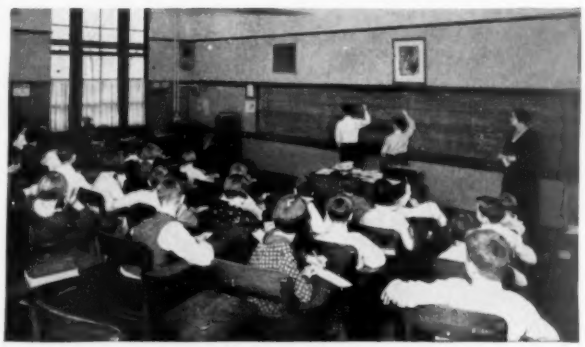

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A nation-wide staff of trained sound specialists is available to help you secure an installation that offers every educational advantage, and yet represents the utmost in economy.

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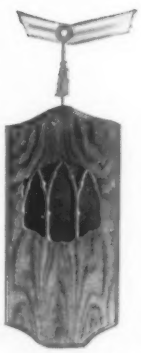


The patented Jack Horner Speaker hangs in the corner and thus provides a sound dispersion unequalled by any ordinary type of speaker

Much time is saved when the principal or other speakers address all pupils in their classrooms over the amplifying system

Typical Operadio Installations

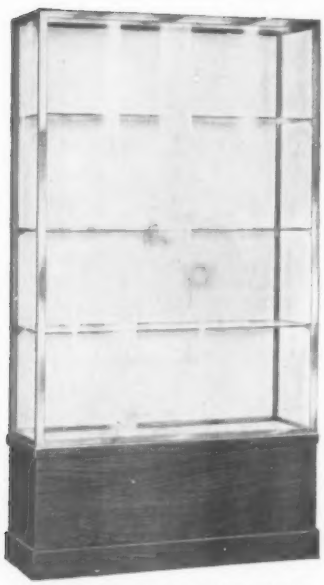
Operadio installations in a number of important schools throughout the country are available. Names of schools having such installations will be gladly furnished on request.

Operadio sales representatives are located in principal cities so you will find it easy to have direct personal contact with factory representatives. Name of the representative nearest you will be furnished promptly on request.

A. N. RUSSELL & SONS CO.

Museum Cases

Ilion, New York



RUSSELL-BUILT WALL CASE
All Russell-Built cases have polished plate glass throughout

Russell Built — ESTABLISHED 1871

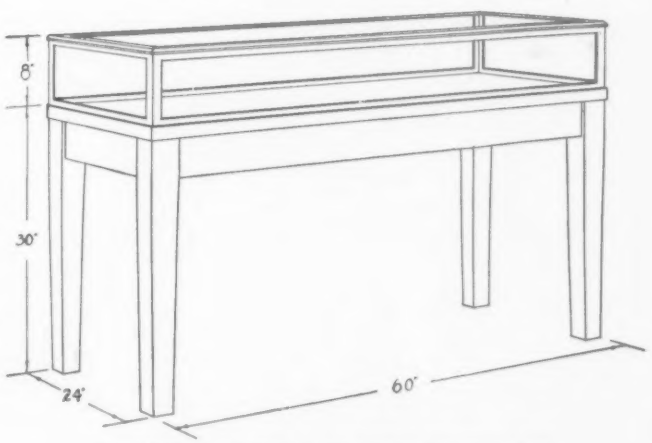
Russell-Built museum cases with frames of aluminum alloy are the recognized standard in the leading museums of the country. The construction is absolutely proof against dust, moisture and vermin. The soft, elusive finish of the aluminum so blends with the surroundings that the exhibit, rather than the case, is seen. Recent installations include the museums of the University of Vermont, the New Jersey College for Women, Schenectady High School and Phillips Academy, Andover, Mass.

Russell-Built cases are also made with frames of architectural bronze. A recent large installation is at the Walton High School, New York City.

Cases of high-grade cabinet woods also are made in Russell-Built construction. Installations have been made at Hamilton College, Wesleyan University, Holy Cross College and Princeton University.

LEYAWOOD

For schools requiring minimum expenditure the Leyawood cases are offered. Frames of oak or birch in standard finishes, fitted with "A" quality flat drawn glass (not to be confused with ordinary cylinder window glass) or at proportionate extra cost polished plate glass. Made in standard sizes to meet all requirements. Table cases, wall cases, aisle cases. They, too, are scientifically constructed to give perfect protection to the contents.



LEYAWOOD TABLE CASE WITH HINGED LID

Russell-Built and Leyawood cases are especially suitable for trophy display
Catalog upon request

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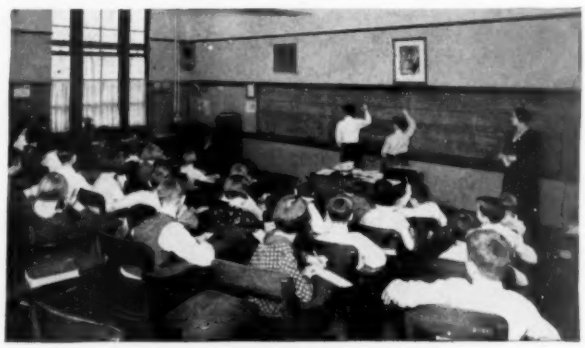
OPERADIO MANUFACTURING CO.

Centralized Radio and Amplifying Systems

St. Charles, Ill.

Music, Voice, and Radio Programs for the School Classroom and Auditorium



Operadio has pioneered in the design of standardized public address and centralized sound systems for use in school classrooms and auditoriums.

Operadio school installations in all parts of the country have amply proved the ability of Operadio equipment and the educational advantages proper amplifier facilities provide.

Phonograph and radio programs may be supplied to the school auditorium and to any desired number of classrooms. In addition, microphones may be placed on the stage, in the principal's office, or at any other convenient point to pick up and carry to the whole school an orchestra concert or a speaker's voice. This arrangement obviates the necessity of transferring children from individual rooms to the auditorium.

A well-liked feature available in Operadio school systems is the remote operation control panel. This panel permits the complete system to be operated from a compact switching unit placed in the principal's office, and the amplifier may be located in any out-of-the-way room, safe from tampering.

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A nation-wide staff of trained sound specialists is available to help you secure an installation that offers every educational advantage, and yet represents the utmost in economy.

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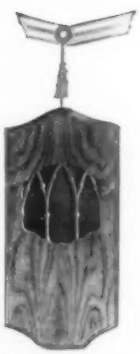

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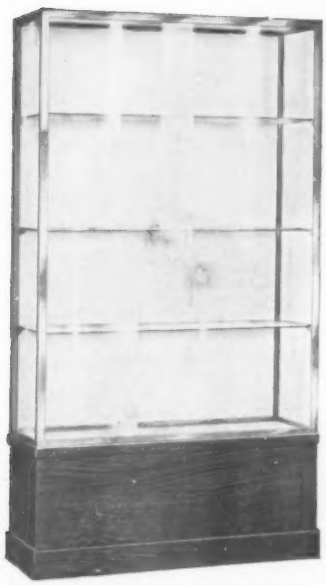

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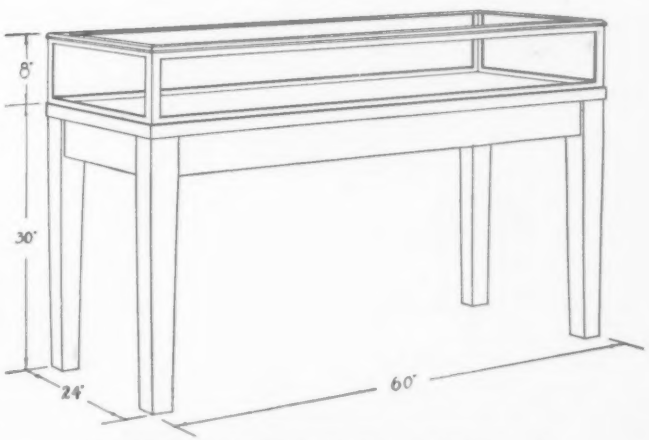

LEYAWOOD TABLE CASE WITH HINGED LID

Russell-Built and Leyawood cases are especially suitable for trophy display
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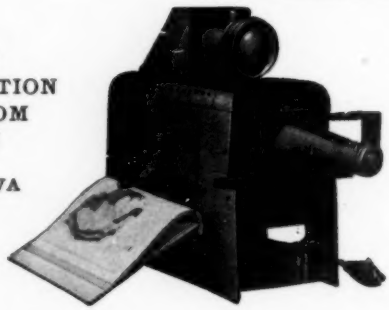
SPENCER COMBINATION CLASSROOM LANTERN

MODEL VA

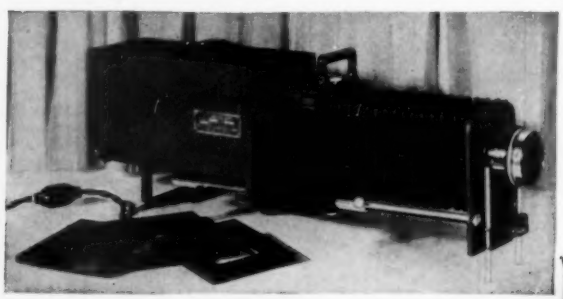


Spencer Model VA is designed for the projection of post-cards, photographs, drawings, etc., interchangeably with glass slides. The change from one to the other is instantaneous. By the addition of a Filmslide Attachment you may also use both filmslides and microscope slides, making this **a four-purpose lantern** at an unusually low price.

The Model V series was built especially to meet classroom conditions; consequently it is compact, portable, easily operated and truly efficient for daily class work. It permits the use of all available illustrations so that the teacher may economically develop his own library.

This model may also be had as an opaque projector only, at a price never before offered for such an outfit. This group is for direct projection on an opaque screen.

Another companion series—Model Y—will accommodate the same types of material but will project all illustrations in their proper position **through a translucent (DAYLIGHT) screen.** Prices are the same for either group.



COLOR PLATE PROJECTORS

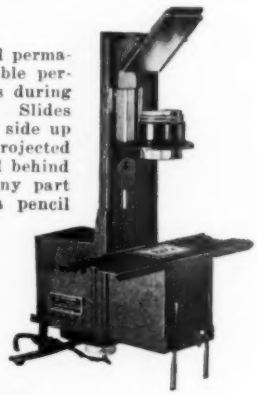
Spencer Model DK was designed especially for protection of natural color plates and other valuable slides.

A motor-driven blower directs a blast of COOL air to the condenser chamber and to the slide, doing away with the objectionable water cell, heat-absorbing glass or other so-called method of eliminating heat.

Model DK is easily portable, simply operated and insures marvelous screen results. Accommodates color plates from 4.5 x 6 cm. up to 3¼″ x 4¼″. An excellent outfit for use in classrooms, small lecture halls and the home.

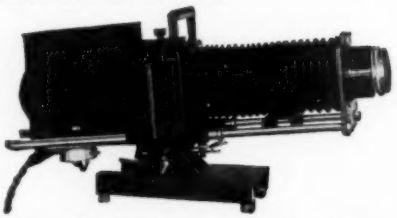
Two larger outfits of this same general design are available for auditorium use and where the larger color plates are used. Model JK accommodates slides up to 4″ x 5″ and the Model LK up to 5″ x 7″.

LECTURE TABLE LANTERN



Spencer Model B—placed permanently on your lecture table permits the use of glass slides during any part of your lecture. Slides are placed on carrier right side up to the lecturer and are projected on a screen hung above and behind him, in plain view from any part of the room. By using a pencil as a pointer it too will be projected, thus indicating to the class the item under discussion. May be used without preliminary set up. Indispensable for class use. The Spencer Model B is efficient and inexpensive.

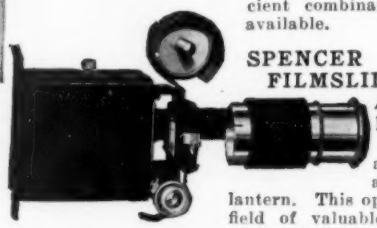
CLASSROOM LANTERN



Spencer Model D for the projection of glass slides in regular class work, embodies several special features incorporated in the design for the convenience of the teacher. It has non-heat conducting carrying handle; **double** tilting device for properly locating screen picture at any desired angle; reading aperture in side of lamphouse; special condensers and lamp insuring remarkably brilliant illumination.

May be used successfully on wall or blackboard as well as screen.

Addition of a Filmslide Attachment gives a three-purpose lantern in one projector. To change from glass to filmslides takes 18 seconds and from filmslides to micro-slides, 5 seconds. This provides the most inexpensive and efficient combination outfit available.



SPENCER FILMSLIDE ATTACHMENTS

May be adapted to any standard lantern. This opens up a new field of valuable educational illustrations from the Spencer Filmslide Library. Filmslides are the cheapest type of illustrative material but are pedagogically and photographically correct.

An exclusive Spencer feature on Filmslide Attachments is the arrangement for accommodating the 3″ x 1″ microscope slides interchangeably with the filmslides at no extra cost.

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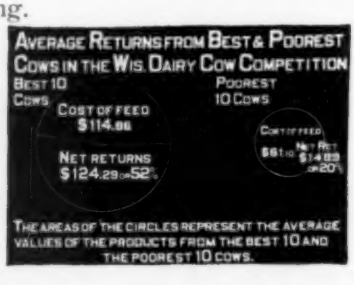
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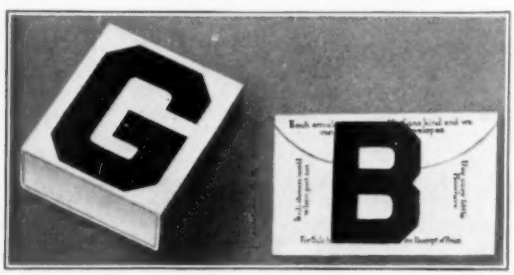

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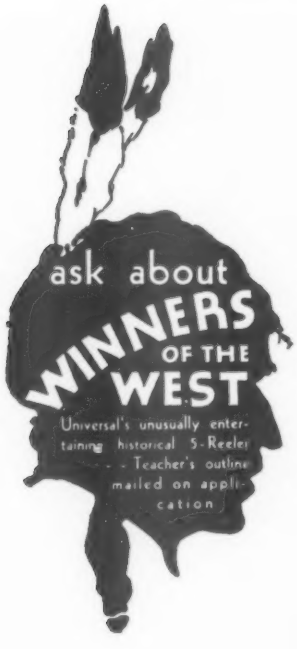

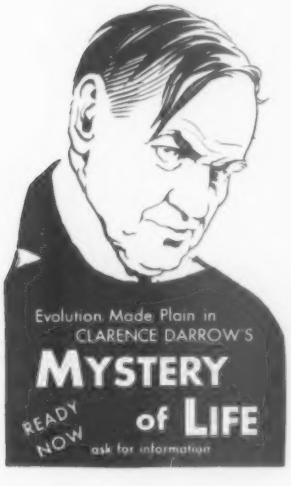

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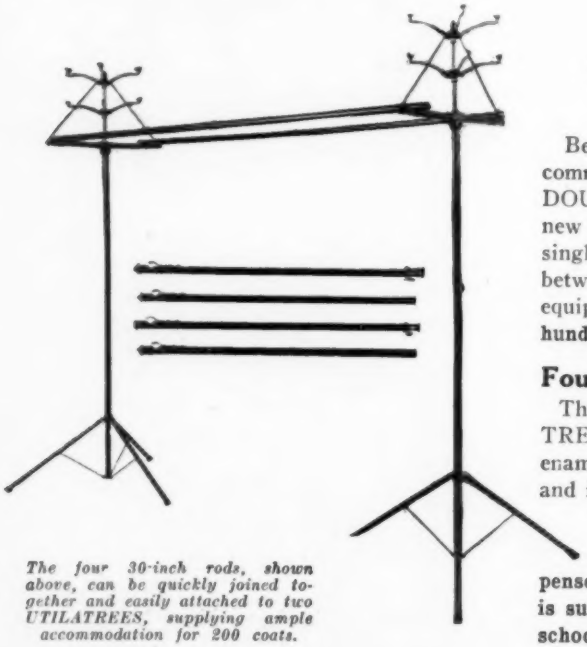
Scientifically designed throughout of seamless steel tubing, the UTILATREE easily supports a load of more than two hundred pounds. Its extremely low center of gravity **prevents its tipping,** even when the load is unevenly balanced.



The four 30-inch rods, shown above, can be quickly joined together and easily attached to two UTILATREES, supplying ample accommodation for 200 coats.

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The DOUBLE UTILATREE— for 200 Coats!

Besides the regular UTILATREE, which accommodates twenty coats, a new model—the DOUBLE UTILATREE—is now offered. This new model, illustrated at the left, consists of two single UTILATREES with two double crossbars between. Here is a valuable piece of school equipment which will take care of **more than two hundred coats,** without wrinkling!

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The UTILATREE and the DOUBLE UTILATREE are available in four standard baked enamel finishes—walnut, olive green, mahogany and ivory.

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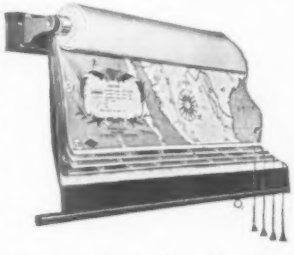

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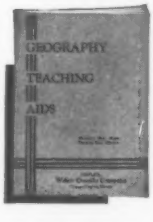

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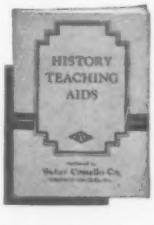

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CAFETERIA—HOME ECONOMICS—DORMITORY

Arrangement and Equipment of School Cafeteria Kitchens

By WILLARD S. FORD

Professor of Education, University of Southern California

NEW elementary schools in increasing numbers, as well as new high schools, provide cafeterias for their students, thereby emphasizing the importance of the proper planning of this service unit. The investment in the construction and equipment of cafeterias is extensive, and frequently provisions have been made which are expensive and unnecessary for efficient service.

Relation of the Kitchen to the Dining Room and Service Room

Efficiency requires that the kitchen be convenient to the service room, which in turn should be adjacent to the dining room. At the same time, the disturbances involved in food-preparation and dish-washing should be eliminated from the remainder of the building as far as possible.

If a considerable number of patrons are served by the cafeteria, the traffic problem requires careful consideration. Entrances to the service room should be adequate in number and size to prevent congestion caused by students waiting to be served. So far as possible, cross traffic of students should be eliminated. This is of particular importance if there is more than one service period. Students should leave the dining room by different exits from those used by students entering the room. An important principle to be followed is to reduce travel distances to a minimum for both employees and patrons.

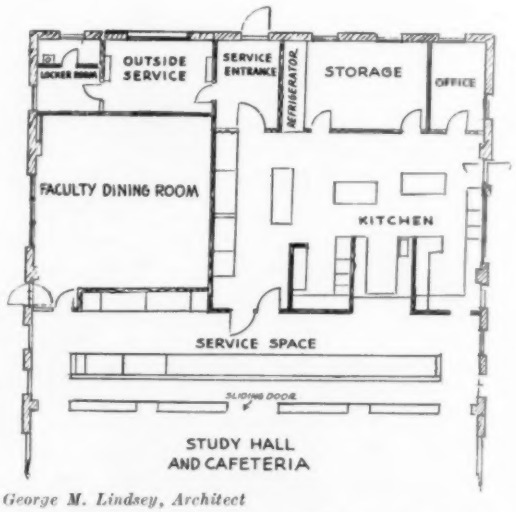
Kitchen Should Be Separable from Dining Room

The use of the dining room for study-hall or other educational purposes requires special planning. The layout should make it possible to entirely separate the cafeteria kitchen and service from the dining room. The separation should remove all appearance of the kitchen and, so far as possible, should eliminate both noise and odor. To achieve this result, at least one permanent partition should separate the two. In the cafeteria of the Arcadia-Monrovia-Duarte High School, Monrovia, Calif., the service room was placed in a central corridor at the side of the kitchen, and there is a soundproof wall with a double door between the kitchen and the study hall. In the South Gate (Calif.) High School the service room is between the kitchen and the study hall-cafeteria. Sliding doors separate the two when the service is not in use.

Special Provisions

In order to eliminate noise and odor, there should be forced ventilation in the cafeteria kitchen, with an outside vent running to the roof. Window ventilation should be provided as far as possible but adequate circulation can best be obtained by having a special fan room. The noise can be largely eliminated by the use of acoustical plaster in the dining room and the kitchen and special soundproofing in the permanent wall separating the two.

Light in the cafeteria rooms is important, both from the standpoint of efficient service and of



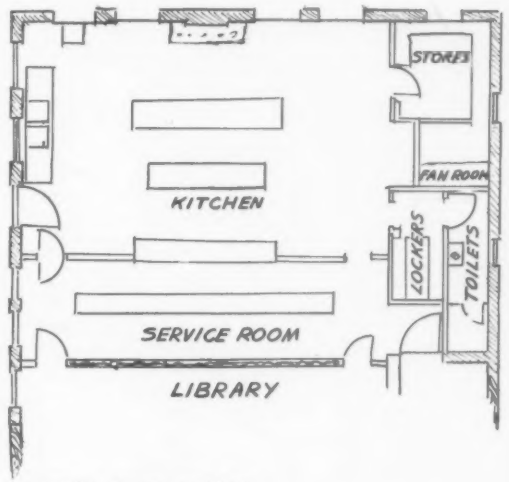
George M. Lindsey, Architect

THE CAFETERIA SERVICE ROOMS IN THE SOUTH GATE HIGH SCHOOL, SOUTH GATE, CALIF.

sanitation. If possible, the window glass area should equal 25 per cent of the floor area. Adequate artificial light will be obtained if one watt per square foot of floor area is allowed. It is important that the artificial light be well distributed. Outlets should be provided for each working unit.

Provision of Auxiliary Rooms

Too frequently those planning school cafeterias consider that the dining room and kitchen are the only necessary rooms. In addition to these, however, there should be special provision for service, a storeroom, an office, a fan room, and lockers and lavatories for the employees. In the Arcadia-Monrovia-Duarte school cafeteria, excellent provision is made for these auxiliary rooms. The office is adjacent to the entrance and is so placed as to give the manager supervision of the kitchen and serving room. The storeroom has space for vegetables and is readily accessible to those who will use the supplies. Similar provisions are made in the South Gate High School.



John Walker Smart, Architect

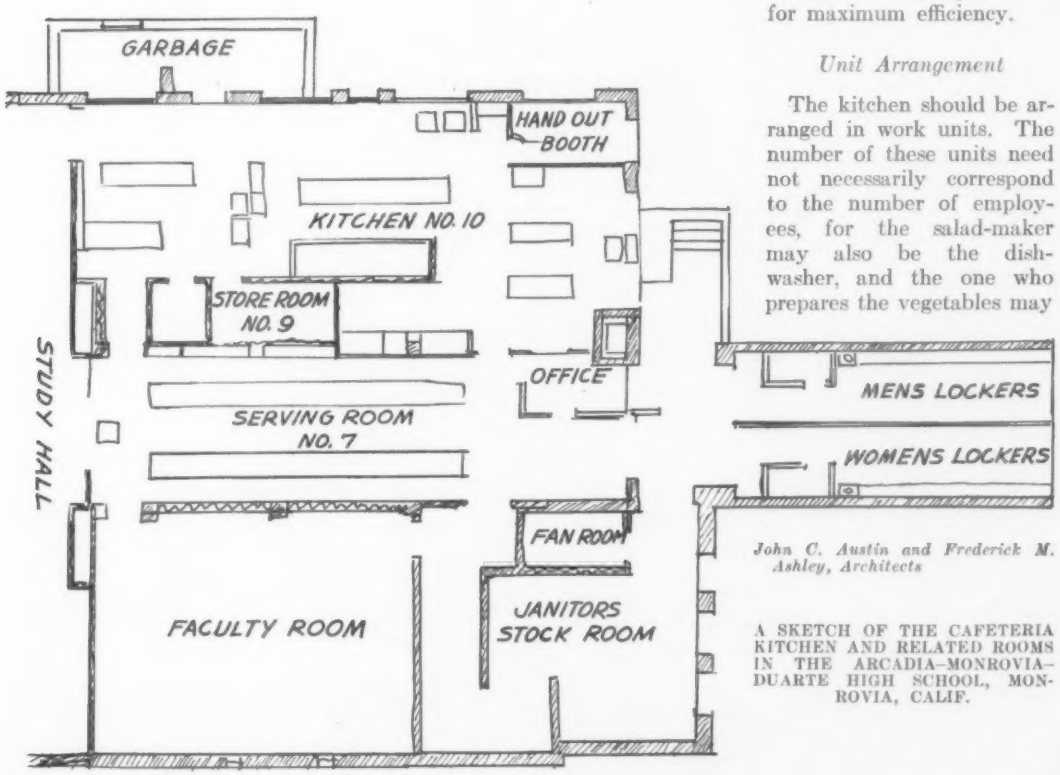
THE CAFETERIA KITCHEN OF THE MARGARITA (ELEMENTARY) SCHOOL, ALHAMBRA, CALIF.
The library is used as a dining room during the noon hour

Space Provision for the Kitchen

The usual mistake is to provide too much, rather than too little, space in the cafeteria kitchen. A large kitchen greatly increases travel distances for the employees, adds definitely to their work load and reduces efficiency. The minimum requirement for a cafeteria kitchen is 300 square feet. When the number of people served exceeds 300, additional space should be provided in proportion to the increased number of patrons. It is probable, however, that the maximum size kitchen in a high school should not exceed 600 square feet for maximum efficiency.

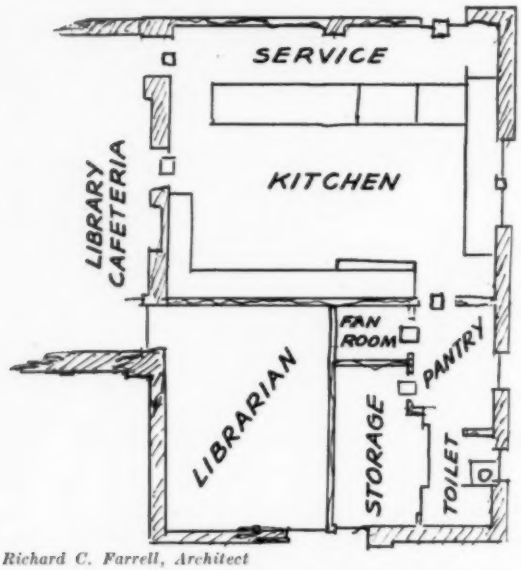
Unit Arrangement

The kitchen should be arranged in work units. The number of these units need not necessarily correspond to the number of employees, for the salad-maker may also be the dishwasher, and the one who prepares the vegetables may



John C. Austin and Frederick M. Ashley, Architects

A SKETCH OF THE CAFETERIA KITCHEN AND RELATED ROOMS IN THE ARCADIA–MONROVIA–DUARTE HIGH SCHOOL, MONROVIA, CALIF.



Richard C. Farrell, Architect

THE LAYOUT OF THE CAFETERIA SERVICE ROOMS IN THE EMERY PARK (ELEMENTARY) SCHOOL, ALHAMBRA, CALIF.

also be the cook. Each of the units, however, should be distinct, with its particular equipment arranged adjacent to the center of the station, in order to reduce the employee's travel distances to a minimum. The following list suggests the units which should be provided and the equipment which should be assembled for each:

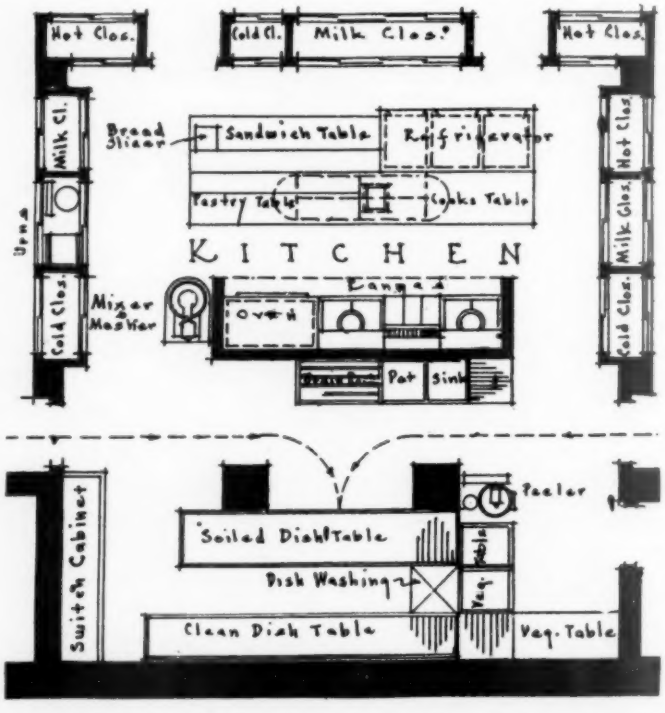
1. Cook's unit
   Range, cook's table with sink, steam kettle, refrigerator and supply cabinet, mixer, utensil rack, and pot sink
2. Baker's unit
   Pastry-table, mixer, oven, sink, baking supplies and utensils
3. Vegetable preparation unit
   Vegetable table, sink, potato peeler, mixer, and supplies
4. Salad unit
   Table, refrigerator and vegetable storage, sink, and cooled cabinet for completed salads
5. Sandwich unit
   Table, supplies, bread-cutter, and meat-slicer
6. Dish-washing unit
   Machine dish-washer, soiled dish-table, clean dish-table, and truck

An excellent illustration of the arrangement of a cafeteria kitchen in work units is the plan of the kitchen in the Warren Harding High School of Bridgeport, Conn. The cook's and baker's units are closely coordinated, and the travel distance of the cook to the refrigerator, pot sink, table, and range is small. There is a separate provision for vegetable preparation, dish-washing, and sandwich-making. The Monrovia-Arcadia-Duarte High School provides separate units for dish-washing, cooking, vegetable-preparation, and salad-making. Similar units are included in the South Gate High School cafeteria.

Special Features in the Kitchen

Sanitation and safety are important factors in the kitchen plan. The floors should be of such material that they can be scrubbed and flushed out daily. At the same time it is necessary that floor coverings should not be slippery, since slippery coverings constitute a real hazard for employees working adjacent to the ranges and mechanical equipment. A concrete or tile kitchen floor is excellent for cleaning, but with either, rubber mats should be placed before the range, work tables and machines.

A requisite in the kitchen is provision for the proper storage for garbage. It is preferable to have the cans at the outside entrance door to the kitchen. They should have a covering and



A PLAN SHOWING THE WORK UNITS IN THE CAFETERIA KITCHEN IN THE WARREN HARDING HIGH SCHOOL, BRIDGEPORT, CONN.

be protected from outside view. Hot and cold water and a drain should be easily accessible, in order that the cans may be frequently and properly cleaned.

Elementary School Cafeteria Kitchens

The service load and the variety of food ordinarily provided for the patrons of an elementary school cafeteria are such that a less elaborate layout is necessary than for a high school cafeteria. The essential features, however, should be provided. Two illustrations of elementary school cafeteria kitchens are presented. One is the Emery Park School of Alhambra, Calif., and the other is the Margarita School of the same city. In both cases the dining room serves as a school library except during the noon hour. To make this possible, the kitchen is entirely separated from the dining room by a permanent partition.

In the case of the Emery Park School the service is furnished through the side of the kitchen over an open counter. Students enter from the main corridor, and pass into the library-cafeteria. In the case of the Margarita School, the service is separated from the kitchen by a permanent partition, which has a large service opening for the transfer of food from the kitchen to the service room. In both of these plans, provision is made for desirable auxiliary rooms, including storage space, fan room, lockers, and lavatories. The Emery Park plan is somewhat preferable, for the amount of space in the Margarita School kitchen, being larger than necessary, reduces the efficiency of the work, inasmuch as one employee handles the entire load.

Space Allotments and Equipment for Home Economics Activities in High Schools*

By MELVIN BRODSHAUG, Ph.D.

THE past fifteen years have evolved a satisfactory solution to the problem of obtaining suitable equipment and furniture for home economic courses in high schools, but the problem of making proper space allotments is one that is yet to be solved. Careful planning, together with a trial and error method, will eventually determine the best plan. Meanwhile, school buildings are constantly being constructed and school authorities demand information which will aid them in solving their immediate problems. At the present time a variety of home economics plants are functioning. The successes and the failures of these, together with the opinions of the best authorities, permit some generalizations to be made.

Guiding Principles

In planning the home economics department in a junior or senior high school, three important considerations should be kept in mind: the curriculum; the teaching methods to be used; and the number of pupils to be accommodated. The curriculum or the activities to be carried on should be the controlling factor in determining the nature of the plant. In the past, limitations of plant facilities have often definitely limited the number and kinds of activities that could be carried on therein and have prohibited the use of desirable teaching methods.

Two generally accepted criteria for home economics plants are these:

1. The home economics plant should simulate life situations.

2. The school environment in home economics should provide conditions somewhat above and in advance of the average standards prevailing in the community. The standards should not, however, be impossible of attainment by the average home in the community.

Character of the Space

At the present time three kinds of space are provided—specialized laboratories, homemaking apartments, and cottages. Many leaders are questioning the value of the laboratory as a suitable environment in which to teach the modern program in home economics. As a reflection of this attitude, there has been a pronounced trend in favor of the apartment and the cottage.

A few schools have gone so far as to eliminate all laboratories; they depend exclusively on the apartment. This would certainly seem to be most desirable in cases where there is only one teacher in the department. Such an arrangement implies the project method of teaching. The class is divided into groups, and each of these pursues different projects in various phases of home economics.

The home economics cottage has had its greatest development in the South. Climatic conditions are primarily responsible for this differentiation.

Location and Planning of the Department

The statement that the home economics department should not be located in the basement

* The recommendations in this article are based on an extensive study made by the writer in 1930: "Buildings and Equipment for Home Economics in Secondary Schools," by Melvin Brodshaug.—Contributions to Education, No. 502. Bureau of Publications, Teachers College, Columbia University, 1932.

HOMEMAKING APARTMENT CLOSETS MAY BE UTILIZED FOR THE STORAGE OF SEWING BOXES, OBVIATING THE NECESSITY FOR BUILT-IN CABINETS

has been repeated so often that it hardly requires emphasis. The ideal choice lies between the first and the top floors. Both have certain advantages. The top floor is to be preferred if there is an elevator easily accessible.

The location in respect to the floor plan of the building offers a more difficult problem. A large home economics department is preferably located in a wing. If the department has an apartment which has a rear exposure, the architect should be asked to specify a home type of window.

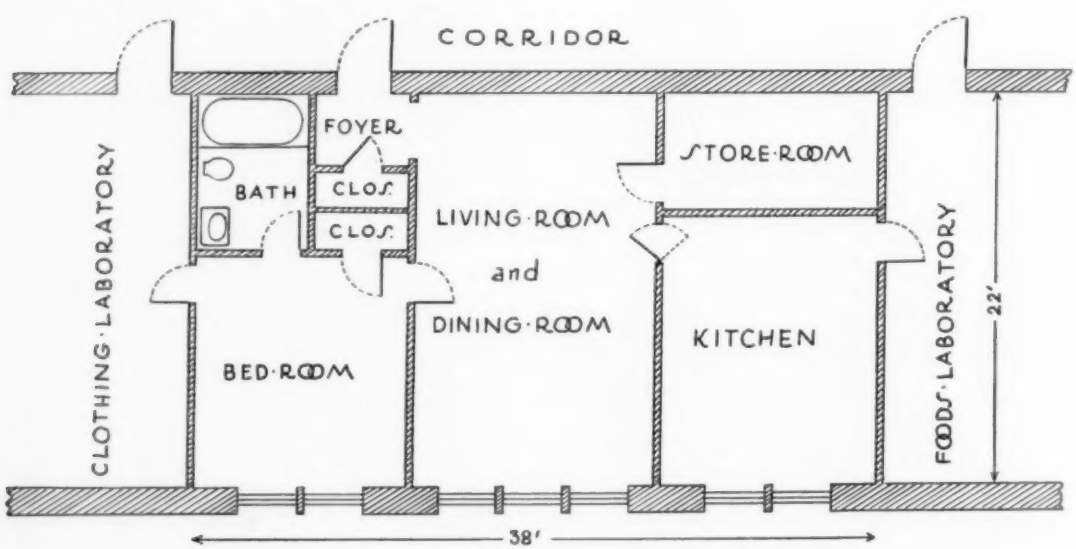
Regarding the planning of the internal arrangement of the department, two general principles can be stated:

1. The home economics department should be *en suite* as an integral unit. Unless the department consists of more than three class areas, the various units should not be separated by corridors.
2. The various rooms of the homemaking apartment should be together or *en suite*, and arranged as nearly as possible as they are in a home.

Homemaking Apartment

The homemaking apartment should be the coordinating unit of the home economics suite. In a small department where there is only one teacher, it is the only space necessary, and on the basis of the criteria presented above, it is the type of space which should be provided under these conditions. A clothing laboratory may be constructed adjacent to the apartment. This should be furnished with regular classroom furniture and may be used by academic classes until two teachers are engaged for the department. An apartment will occupy approximately the same amount of space as a laboratory; 38 by 22 feet is adequate. Thirty-five square feet per pupil-station should be the standard in the apartment as well as in the laboratories.

The homemaking apartment should be constructed as much as possible to resemble a home, in respect to types of windows, radiators, light fixtures, ceiling height (a suspended ceiling is



A PROPOSED HOMEMAKING APARTMENT

recommended in the kitchen, bedroom and bathroom), floor materials, doors, walls, curtains, decorations and other minor details.

An apartment kitchen to accommodate four pupils should measure approximately 12 by 15 feet. It is desirable to have it adjacent to the combination living room on one side and the foods laboratory on the other side. The window of the kitchen should be on the short side of the room, with a combined sink and tub placed beneath it. The electric outlets should consist of one baseboard outlet and one wall outlet with safety control. A gas range will be found to be the standard in most communities. Additional equipment may consist of a kitchen table, stools, a kitchen cabinet and built-in cupboards, a cabinet ironing board, and a refrigerator, all of a quality to be determined by the standards attainable by the average home in the community.

A combination living and dining room, rather than two separate rooms, is recommended. This area should be about 14 by 22 feet. A large storeroom at least 6 by 8 feet (preferably leading off from the foyer) must be provided. Five wall light fixtures and four baseboard electric outlets are suggested. Recommended equipment consists of a davenport, a library extension table, a wing chair, a Windsor chair, three straight-backed chairs, a desk, a tea-wagon, a rug, end tables and floor lamps, selected on the same bases of quality as the kitchen equipment.

The bedroom should measure 12 by 14 feet and should be easily accessible to the clothing laboratory. A small closet is desirable, as are wall light fixtures and baseboard outlets. The equipment may consist of a three-quarter-sized bed (not a hospital type), a dresser, a mirror, a table, chairs, and appropriate accessories so arranged as to give an attractive home atmosphere.

In school buildings it is most practical to place the bathroom adjoining the bedroom. A room 7 by 9 feet is adequate. Tile floor and wainscoting should be the standard. Installations usually consist of a built-in bathtub, a water closet, porcelain lavatory, cabinet and mirror.

Special Rooms

Few of the larger schools have eliminated special laboratories altogether, but they have eliminated certain types. Foods and clothing laboratories are the only ones found consistently.

Combination foods and clothing laboratories are sometimes used in one-teacher departments,

Photographs by courtesy of L. Knappenberger, Storrs, Conn.

A CLOTHING LABORATORY WHICH REPRESENTS A DEVIATION FROM THE TRADITIONAL

but they result in low space utilization. Homemaking apartments are therefore recommended in their place. Storage rooms are unnecessary in connection with well-planned laboratories, but are essential in the apartment. Pantries are no longer used. A departmental office is hardly justified in a small department.

Foods Laboratory

A foods laboratory 38 by 22 feet will accommodate 24 students and provide the standard 35 square feet per pupil. Bilateral lighting is not objectionable, and in the warmer climates it will give cross-ventilation. Construction details should include two corridor doors, battleship linoleum floor, washable walls, 15 feet of cupboard space, 10 feet of slate blackboard, 20 square feet of bulletin board, and a built-in bookcase.

The unit kitchen arrangement most nearly resembles home conditions. Six units each 8 by 9 feet may be constructed, separated by tile partitions. Each unit kitchen should represent a variety in quality and type of equipment. Gas ranges will probably prevail, although electric should be represented. Additional unit kitchen equipment will consist of sinks, kitchen cabinets, kitchen tables, stools, and electric power outlets. The sink in the front outside unit should be combined with a tub to constitute a laundry unit. Desirable general equipment will include a teacher's desk or table, a refrigerator, a supply table and a fire extinguisher.

Clothing Laboratory

A clothing laboratory 38 by 22 feet will provide space for 24 pupils. A northern exposure is recommended and unilateral light should be required. Construction details should include two corridor doors, six baseboard electric outlets along the outer wall for machines, two wall outlets for irons, 15 feet of cupboard space, a wardrobe, two ironing boards, individual lockers 6 by 12 by 24 inches, a bookcase, a small sink, pattern files and built-in mirror, 15 feet of blackboard, and

A UNIT KITCHEN IN A FOODS LABORATORY
The equipment and arrangement are excellent although the stalls are higher than recommended

30 square feet of bulletin board. A fitting space with curtain should be provided in one corner.

The sewing tables suggested are the two-pupil size, 24 by 70 inches top and not over 28 inches high, without drawers. Comfortable sewing chairs should be low-backed and not over 15½ inches high. Chairs for use with the machines are better if 18 inches high. Six sewing machines representing different makes and types, at least one being electric, is the suggested standard. The cutting table may have files beneath it. A regular office desk is suitable for the teacher.

Careful Planning Necessary

In view of the radical and rapid changes being made in home economics curriculums, the authorities responsible for providing new buildings must plan carefully if the home economics space is not to become obsolete prematurely. They must realize that the present trend is to simulate more and more the conditions desirable in the average home.

Student Residence Halls—New Model

By HARRIET HAYES

Teachers College, Columbia University

IF colleges and universities were to adopt the methods of motor-car manufacturers and issue competitive advertisements describing their housing facilities, and if students were invited to choose their colleges on the basis of the living quarters offered, a considerable amount of indignant protest would at once be directed at our institutions of higher education.

Fantastic as such a procedure might seem, something akin to it is actually taking place in a small way in American colleges today. A new leaven is at work in our midst, transforming our educational plants and making great changes in the educational programs. As a result, we find house plans, residential campuses, student unions, and various other manifestations of interest on the part of the colleges in the residential and social phases of student life; and the public announcements of these experiments and developments are being given increasing attention each year by prospective students.

The older conception, especially prevalent in connection with men's living quarters, that a college dormitory is a mere convenience, to be administered by a business officer, along with the laundry and heating plant, is rapidly being replaced by the idea that residential buildings are an important part of the educational offering of the institution, and that they should be planned and administered with such purpose in view.

What a Dormitory Should Provide

When we think of student residence halls, we usually have in mind not only the physical buildings but also the administrative staff and the various services maintained. While it is impossible to state precisely the part that buildings should have in developing a fine type of student life, it is obvious that these structures must form the background of opportunity and encouragement for such living. They should contribute to the good health and well-being of their occupants, and they should exemplify, rather than violate, generally recognized standards of proper living. Since they have been erected for the special use of students, residence halls may also be expected to provide suitable conditions for study. And since young people must have opportunities for meeting one another and entertaining guests, their college homes must offer facilities for social life. All these would seem to be obvious necessities in a student hall, and they are. But the melancholy fact is that many dormitories, including even some of the more elaborate and expensive ones, fail to meet these reasonable requirements in certain particulars.

Safety Is the First Requirement

If we were to reduce these general requirements for residence halls to specific recommendations, we should soon find ourselves in a network of details. A few important qualifications for a student dormitory, however, may be suggested. For example, the first requirement—that a building contribute to the health and general well-being of its occupants—calls for a structure that is safe. Fire, earthquake, floods, cyclones, and similar dangers should be provided against.

The present tendency on the part of colleges to erect only fireproof dormitories is a step toward meeting this standard. Small fires are very common in student halls, and occasionally large and disastrous ones break out. While many of these are caused by the carelessness of occupants (and students *are* careless), the various surveys that have been made of college buildings show many hazardous conditions in the buildings themselves, including insufficient protection in the way of fire-fighting equipment. It is of the utmost importance that buildings be examined frequently and carefully, in order that safe conditions be maintained, and full protection afforded in panics and other emergencies.

Certain California institutions have learned through bitter experience the necessity for providing against earthquakes. Other regions, subject to damp soil conditions and possible floods, have learned to provide against these. Basement rooms are no longer regarded as suitable for living and sleeping purposes, especially where the ground about the building tends to be damp. More and more interest is being manifested in regard to safety and sanitation in dormitories.

Students' Health Must Be Protected

Protection of the health of students requires a host of provisions. It calls for, and is now getting in our better halls, a plentiful supply of water for drinking and for bathing. It will see that enough baths, lavatories and toilets are available to enable students to follow the hygienic practices advocated in their classrooms. One toilet, one lavatory, and one bath for each four students is a standard that has been recommended for years in connection with student residence halls, and newer buildings are likely to be well provided with these facilities. The importance of personal cleanliness and of hygienic habits of living is being recognized more fully every day. College dormitory facilities should be such as to encourage these habits.

There are other evidences that the health of

students is receiving more attention than formerly: double beds and double-deck beds have been very generally discarded in residence halls, having been replaced by single beds; sunshine and good ventilation are coming to be regarded as essential for student rooms; and sanitary and cleanly conditions are being stressed in connection with both buildings and equipment.

Consideration to Personal Needs

Students' personal needs are receiving much consideration in the more carefully planned halls. Bedrooms and clothes closets are larger, and many conveniences are being included. More lavatories are being placed in student rooms, especially in women's halls, with the result that towels, washcloths, and toilet articles are taken care of in an orderly manner, and much irritation is avoided.

Students seem to have more personal belongings than they used to, and places must be made for them. While it is true that people wear fewer articles of clothing at a given time, they more than make up for this saving by having more changes and more kinds of clothing. Sports clothes for daily wear on the campus, athletic costumes and equipment for out-of-door activities of various kinds, more formal clothes for afternoon and evening affairs, heavy coats and sweaters, and shoes of a variety of types—all these call for a considerable amount of space. In addition, there are hats, suitcases and other miscellaneous articles to be cared for somewhere. As a result, closets are being designed with increasingly generous dimensions, even 4 x 5 feet being occasionally specified. Almost all closets are, of course, individual, a very important point in planning.

Facilities for Study

Most students living in residence halls spend at least several hours each day studying in their rooms. Although college dormitories are commonly thought of as centers for this kind of activity, the provisions for it in many halls are most inadequate. Proper facilities for study will ordinarily call for the following: (1) a comfortable (but not lounge type) chair; (2) an individual table or desk that is large enough to hold the usual number of books, papers, and similar articles needed (a space 2 x 3 feet is usually of sufficient size for such a purpose); (3) drawer space for miscellaneous supplies; and (4) a bookcase. In addition to the physical equipment there must be favorable conditions for study. These include a comfortable temperature, good ventilation, freedom from troublesome noises and interruptions, and, above all, a good light. A really modern dormitory furnishes adequate light just as it furnishes adequate heat, for both are of equal importance.

The Importance of Adequate Light

Life today, at least as lived by literate persons, makes tremendous demands upon eyesight. Students' work ranks with the most exacting kinds of commercial and industrial occupations, such as bookkeeping, proofreading, drawing and sewing. Yet the amount of light supplied to student study tables in college dormitories is commonly not more than a third or a half the amount recognized as standard for workers in these other fields. If the eyes of students are to be properly safeguarded, according to established industrial standards, an intensity of approximately 12 foot-candles of light should be available over the entire working surface, and this light should be delivered without glare or other harmful annoyances. The color of light, also, has been found to be of importance, the experiments of Dr. C. E. Ferree and Dr. G. Rand having shown that a color approximating that of daylight enables the eyes to function with greater ease and efficiency.

The allowance of one watt of light for each square foot of floor space in a room, which is sometimes taken as the basis for equipment, does not ordinarily serve the needs of students at work. Since the color and texture of lampshades, as well as their type and position, greatly affect the amount of light that becomes available on the working plane, and since the colors used in the room generally vary greatly in their tendency to absorb light, it is impossible to state in a general rule the number of watts of light that are called for in a given instance. But it is doubtful whether a bulb of less than 60 or 75 watts will furnish adequate light for a study table lamp. This should be in addition to the general lighting of the room.*

Provisions for Social Life

Provision for social life in student residence halls requires very careful planning. The reason is that students are social in different ways, and for each of these, special facilities may be needed. First of all, students need space and facilities for a comfortable home life among themselves—common meeting places where they may talk, play games, sing and perhaps dance. To provide for this informal sociability, a general clubroom or lounge may be planned, or, as is often the case in women's halls, social rooms may be placed upon upper bedroom floors. All such rooms are as a rule provided with kitchenettes or are near to rooms in which refreshments may be prepared. Large basement areas, roofs, outdoor courts and similar areas have also been utilized for club and recreation centers.

In the second place, students need facilities for the entertainment of callers and guests. In

* The question of adequate lighting is too complicated for discussion in so brief an article as this. Those interested will find a fuller treatment in Chapter XVI of "Planning Residence Halls," by Harriet Hayes.—Bureau of Publications, Teachers College, Columbia University, 1932.

a women's hall, where callers are very generally received upon an individual basis, special attention should be given to this need. But accommodation for the reception of friends and relatives should be available in all halls. In large living rooms a certain amount of privacy can be afforded by recesses, arrangement of furniture, and sufficient space. But the addition of at least one or two smaller rooms is extremely desirable. Sun-porches, verandas, and corners in reception halls can also be made use of.

A Room for Formal Group Entertaining

The third need for social space in a residence hall is for a large central room or combination of rooms, sufficient in size to enable the entire household to meet at one time and entertain guests. As most house groups, like most families, desire to receive with some formality on special occasions, this room should be planned with such occasions in mind. It should not be so formal that it is unsuited to everyday needs and uses, but it should have sufficient dignity and should be arranged to provide a suitable background for all-house social affairs. It is most important, in planning these main rooms, to avoid narrow doorways between the various areas which may need to be thrown together, so that the arrival and departure of guests, the serving of refreshments, and similar activities may proceed without difficulty.

No Uniformity in Space Allotments

The size and arrangement of these main social rooms will of course be determined on the basis of the administrative plans for each hall. The present tendency in building is in the direction of more liberal space. In terms of proportional areas, the allowance for social rooms has been very different in various dormitories. Perhaps the allowance of 20 square feet per student furnishes the best basis upon which to work, in women's halls at least. But, as has been said, the problem will be solved correctly only when the type of life and the various social activities that are to be carried on in the building are thought of, and the proposed plans studied to see whether they provide in a practical and economical way for each and every one of the probable uses.

Residence Halls Should Promote the Education of the Students

The foregoing discussion lists only a few of the essential considerations that should govern the planning of student residence halls. While the term "new" has been used in connection with some of the points, such novelty as they possess lies in the new emphasis which they represent—the growing realization that the college home in which a student spends a large share of his time is a highly influential factor in his education. New knowledge regarding hygiene and sanitation is being taught in college classrooms; it should be put into practice in college dormitories. New strains and social problems are developing in our modern life; students should be given a background of wholesome and helpful living conditions, designed to mitigate rather than to increase these strains. We are realizing as never before the importance of living together in a spirit of friendly cooperation; college dormitories offer probably the best laboratory that could be devised for teaching cooperative living. It is not necessary for residence halls to be highly expensive or architecturally elaborate, but it is imperative that they be planned to make possible a type of student life that is fine and worthy of our hopes for American college youth.

New York State's New Home for Homemakers

The Building of the College of Home Economics at Cornell University

By KATHLEEN HALSTED SMALL

WHAT promises to be the most modern and best equipped home economics building in the country is now in the process of construction at Cornell University, where it will house the New York State College of Home Economics.

The building will serve, as does the one now being used, as a center for instruction, for research and for extension work throughout New York State. Its use for instruction is perhaps unique, for not only does it provide classrooms, laboratories and equipment, but it will also act as a lever for the ingenuity and constructive planning ability of the students. Students will, for example, help to plan and carry out the management of the library, will cooperate with members of the staff in deciding the most desirable equipment for certain laboratories, and will in general have a constantly active part in the daily running of the building. In this way, it is planned, they will develop a habit of constructive thinking which will be of most practical use to them later in the management of a home, profession or business.

A SKETCH OF THE BUILDING NOW BEING CONSTRUCTED FOR THE NEW YORK STATE COLLEGE OF HOME ECONOMICS AT CORNELL UNIVERSITY, ITHACA, N. Y.

Architecture and Plan

The final plans for the building are the result of the efforts of William E. Haugaard, Commissioner of Architecture of New York State; the New York State Department of Education; and members of the college staff, with whom they cooperated in a most understanding and appreciative way.

The style of architecture and the location of the building were determined in part by the need to harmonize with the plans for the other state buildings. Since those plans call for a quadrangle mainly of buff brick with a Georgian tendency, the architectural type of the Home Economics building is Georgian, and buff brick is used for the exterior. The building is 349 feet long, 167 feet wide, four stories high in front, six in the rear and seven in the center. By grouping the offices together instead of placing them separately near the laboratories, an extra floor is gained in the central section. The plan of the building, consisting of a long central section connecting two large wings, is designed to give a feeling of unity with the two buildings which it faces, and from which it is separated by a campus road. The Home Economics building faces south.

All Departments Accommodated

A sunken garden in front of the main entrance also helps to unite pleasantly the different ground levels of the new and old buildings. The garden is a means, too, of giving more light to the kitchens and the offices on the ground floor. In front of the entrance to the annex, which houses the nursery schools and practice apartments, is another garden with a terrace, particularly for the use of the children and babies observed there. At the service entrance in the rear is a service yard.

The new building will house all departments of the College of Home Economics. At present, besides the central building, the college has two separately located practice houses and a nursery school building. When the new building is completed, these will all be under one roof.

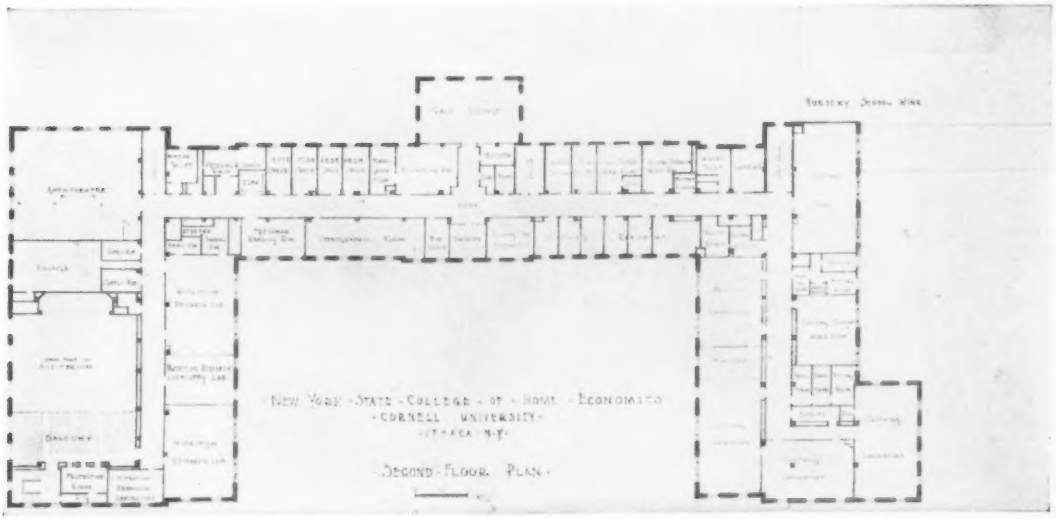
Cafeteria and Food Laboratories

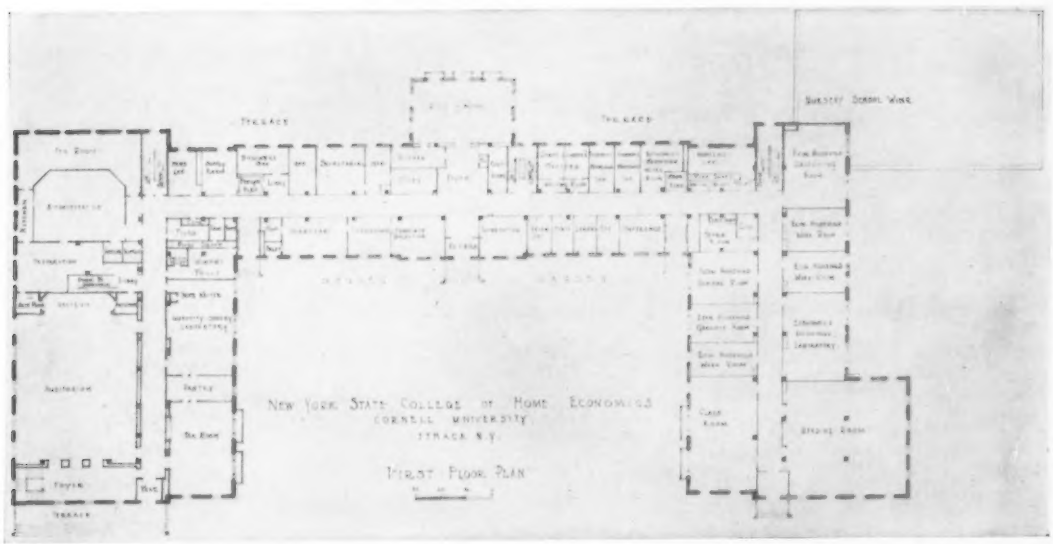
The whole building is so arranged that the departments most closely related are grouped together. Thus the laboratories of the departments of foods, nutrition and chemistry are in the same wing as the cafeteria. The new cafeteria will be much larger than the one in the old building, which has been feeding a large public daily. Its purpose will be, as it has been, to serve as a laboratory in which students in institutional management and hotel administration may gain practical experience. The arrangement is such that the counter room may be partly closed to serve the main or the lesser dining room, or may be opened to serve both at once during such busy times as Farm and Home Week.

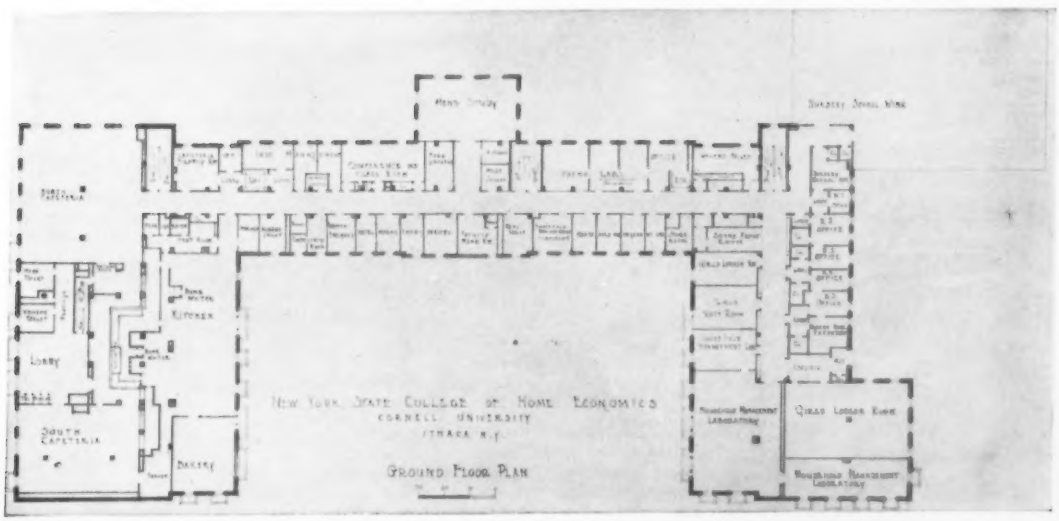
The foods laboratories are of two types, the unit kitchen, where students will work singly or in pairs with the same kind of equipment as that used in their homes; and the group kitchen, where work will be done under laboratory conditions. There are a student foods workroom to be used for individual work; laboratories for graduate research; equipment laboratories in which all types of household equipment, including electrical and gas, may be studied; nutrition laboratories so fitted that students can carry on experiments with animals and with chemical analyses; and special laboratories for child nutrition, equipped with metabolism apparatus and arranged for studies in which children are observed.

Auditorium and Amphitheater

Lectures of interest to the general public as well as to students will be given in the auditorium, which has a seating capacity of approxi-


NEW YORK STATE COLLEGE OF HOME ECONOMICS
CORNELL UNIVERSITY
ITHACA N.Y.
SECOND FLOOR PLAN


NEW YORK STATE COLLEGE OF HOME ECONOMICS
CORNELL UNIVERSITY
ITHACA N.Y.
FIRST FLOOR PLAN


NEW YORK STATE COLLEGE OF HOME ECONOMICS
CORNELL UNIVERSITY
ITHACA N.Y.
GROUND FLOOR PLAN

mately 600. It is on the first floor, on the corner of the building nearest the car line, and is close to the quantity cookery kitchens so that special parties may be served on occasion. It is equipped with special wiring for broadcasting and radio reception. A track on which extra chairs may be taken in or out runs under the stage and into a small supply room. Dressing rooms connect with the stage.

On the same floor and in the same wing as the auditorium is an amphitheater two stories high. The seats and platform are especially arranged so that demonstrations may be given before audiences of as many as 200 persons. One unit of the platform is stationary and is equipped with a sink and gas and electric outlets; other units are transferable and may be kept in a supply room, to be rolled in when desired. Opening into the amphitheater is a large preparation room with an adjacent kitchen.

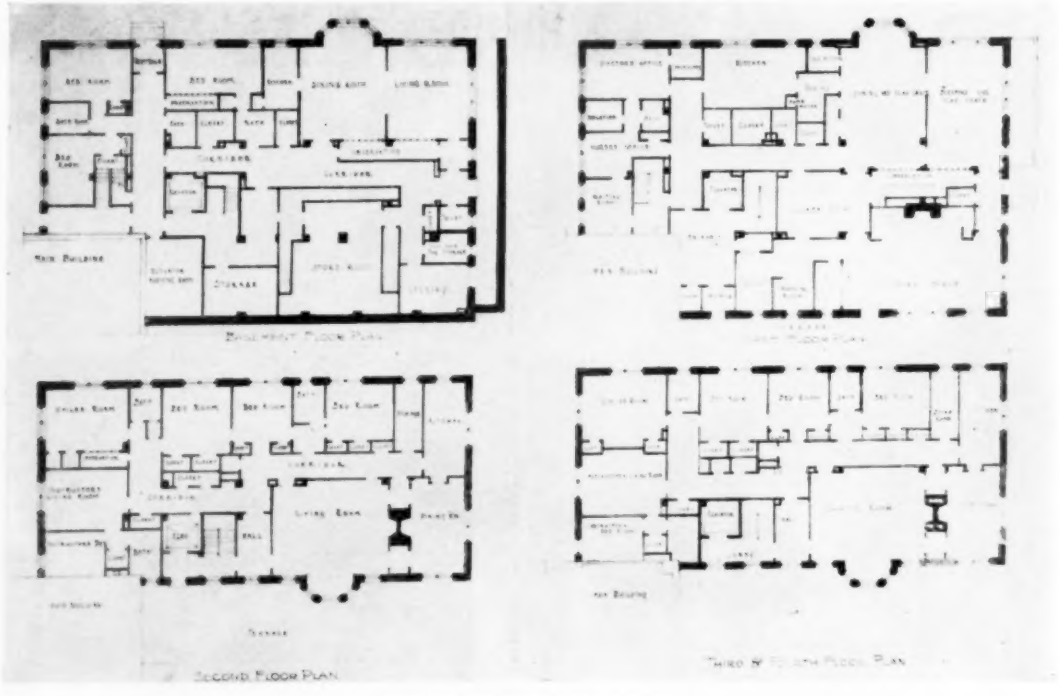
Reading and Recreation Rooms

The large reading room on the first floor will be the central reading room for the whole building. It is in the same wing as the classrooms for economics of the household, since this department assigns a great deal of reading. There are also provisions for a freshman reading room; a room for each department, which students may use for special or make-up work; a study for men students and a lounge for women students; a general reception room; and recreation rooms for the housekeepers and the stenographers. Each reception and recreation room has a small adjoining kitchen.

There is a soundproof room in which psychological experiments in sound may be made; conference rooms scattered throughout the building in which small groups of students can meet; and, on every floor, receiving and supply rooms to meet the needs of the departments on that particular floor. The plans provide for two automatic elevators in the main building and a smaller one in the annex.

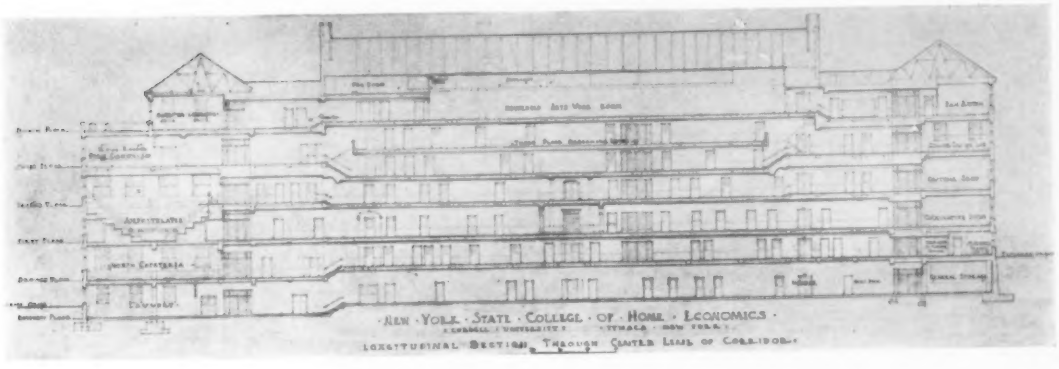
Display Laboratories and Shops

The largest laboratory of the clothing department, on the second floor, has a stage on which students can display costumes, and a screen for lantern slides illustrating historic costumes in connection with modern styles. There is a textile laboratory on the third floor where fabrics will be displayed and analyzed; a student workroom, to be at all times entirely under student direction; and a costume shop where students will get actual experience in dealing with customers. The household arts department includes a room 25 by 143 feet, on the fourth floor, where with the use of theater flats students will be able to set up rooms with real furnishings.



THE NURSERY SCHOOL WING

A fifth floor contains a sun room and a storage closet, surrounded by a large expanse of terrace



The Nursery School

The nursery school plans provide for two complete schools, which meet every need of a child's day. The floor plans are as similar as possible to that of a typical home. A fireplace and inglenook in the big playroom add to the atmosphere of hominess and provide interesting centers for stories and doll play. The kitchen is planned to be a part of the children's rooms and as easy of access as their kitchens at home. There are sufficient lighting outlets for later possible wiring for health rays and photographic purposes; provision for a soundproof room; and a dark room for films.

Specially arranged hidden corridors are a part of the construction, so that students and adults may observe the children at work and at play without themselves being seen. They are so placed that from one booth a group of students may watch washing and dressing; from a second booth another group may study the children in the large playroom; from a third booth students may observe dining-room activity; and from a fourth and centered booth the children may be observed on the sleeping porch, in the dining room or in the playroom. These booths are entered both from the ground floor and from outside, and are so arranged that the children will not be disturbed.

Isolation Rooms

Between the nurses' and doctors' offices, which are on the first floor, is an isolation room equipped with shelves of easily sterilized toys, washable rugs and other furnishings that can readily be disinfected. Here children suspected of colds can play under observation until it is safe for them to mingle with the other children. As the parents' entrance to the nursery school leads into a waiting room which adjoins the nurses' office, the children do not come into contact with other people until they have been inspected. Another isolation room opening off the dining room is for the child not yet ready to eat with other children or for the one who eats better alone than with the group. For the child who for any reason needs to be by himself, there is a third isolation room between the sleeping porch and the playroom.

The Practice Houses

In the same wing or annex with the nursery school are three practice houses. These are apartments where students will live for varying periods and will go through all the experiences of running a household of which a baby and a young child are a part. Besides the students' quarters in these apartments, there are a bedroom, a study and a bath in each for the use of the instructor in charge. On top of the annex are a big recreation room and a flat roof for the enjoyment of both students and children. The rooms in this annex adjoin the associated psychological and observation rooms in the main building.

Play Space—Equipment—Furniture

A space at the side and rear of the annex is reserved for play space for the nursery school children. It will be inconspicuously fenced, and will include wide open grass spaces, parts of which are sunny throughout the day; trees for shade and to climb; walks to run and ride on; steps that are wide and deep; places to dig, places for pets; a low wall to sit and walk on, shrubs to hide under; paths of pebbles and paths of stepping stones; and play equipment.

The furniture throughout the entire building will be as simple and modern as possible. The office and laboratory furniture will for the most part be metal, which is practically indestructible and not liable to splinters and breakage. Everything is planned for efficiency and convenience.

The complete building will cost $985,000, or approximately 39½ cents a cubic foot.

Designing the Social Unit of a Modern High School

By JOHN LEONARD HAMILTON

HAMILTON, FELLOWS AND NEDVED, ARCHITECTS, CHICAGO

THE STUDENTS' CAFETERIA SERVING ROOM IN THE NEW TRIER TOWNSHIP HIGH SCHOOL, WINNETKA, ILL.

THE design of a self-contained social building or wing as one of the principal divisions in the plan of a large high school is one of the most interesting developments in the evolution of the modern high school plant. In such a unit are usually grouped the auditorium and cafeteria with all of their accessories, pertinent to a wide variety of uses. Other activities such as music and dramatic art are properly housed in proximity to the auditorium, while cooking and household arts are frequently grouped with the cafeteria.

The design and organization of such a unit on a very large scale, with ample funds and space, and as a part of a well-conceived general plan, is an opportunity that is rarely presented.

THE FACULTY DINING ROOM (ABOVE) AND THE STUDENTS' MAIN DINING HALL IN THE NEW TRIER TOWNSHIP HIGH SCHOOL

The New Trier School

The social wing of the New Trier Township High School at Winnetka, Ill., by Perkins, Fellows and Hamilton, was one of the first examples of the grouping of these rooms for social activities. This building, originally built in 1912 and enlarged and improved in 1921, contains a small auditorium seating 1,000, students' mess halls seating 750, a faculty dining room for 150, and kitchens, serving rooms and stock rooms. The wing represents an expenditure of about $200,000. The serving room in this case is placed between the kitchen and the students' mess halls and may be closed off from the latter by rolling shutters. Used dishes are picked up by dish carts after each sitting. Tables and chairs are of the folding type, since the halls are frequently cleared for dancing.

The Evanston High School

The social wing of the Evanston, Ill., High School, designed by Hamilton, Fellows and Nedved, recently built at a cost of $440,000, is the first section of the south building of that great institution, which will shortly be completed by the construction of a large auditorium. The unit, as indicated in the accompanying floor plans, contains three students' dining halls 54 by 100 feet in size, each with a normal seating capacity of 500 and a maximum of 600; a faculty dining room 36 by 70 feet, seating 200; four cafeteria serving rooms; and a central kitchen.

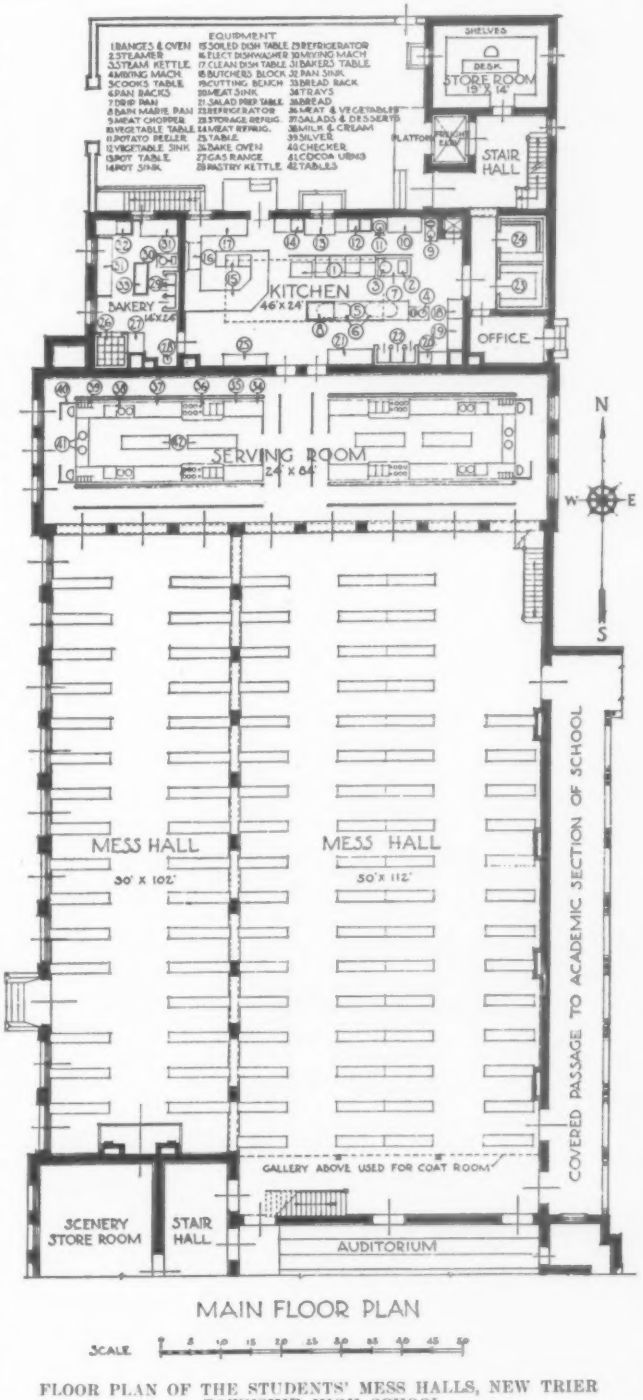
The three-story plan of cafeteria service was adopted in place of the one-story plan originally contemplated, in order to avoid the congestion and delay incidental to the movement of 1,500 to 1,800 students on one level. With the present arrangement, each floor of the academic building is directly connected with a dining hall.

As the activities provided for in the social unit will often be closely related to the evening use of the main auditorium, they are grouped together with ample circulation passages for large crowds. Toilet and dressing rooms are conveniently placed so that the wing may be used for large evening parties without opening the other sections of the building.

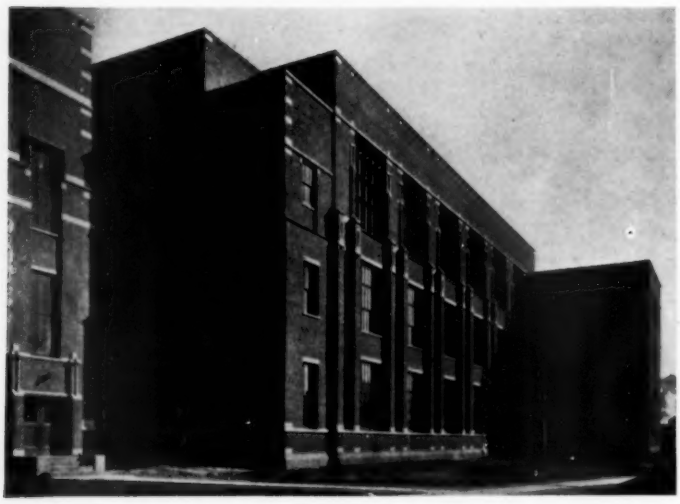
The Dining Halls

Each students' dining hall has an adjoining serving room equipped with four modern cafeteria counters, providing four independent lines of service. This arrangement gives a service time of about fifteen minutes for a full sitting, allowing the remaining twenty-five minutes of the forty-minute period for eating and social enjoyment. At the ends of the dining halls, opposite the service rooms, are the dish-washing rooms where the students deposit their trays of dishes on the way out. The washing of dishes and the disposal of garbage is thus kept entirely independent of the serving of foods.

The first- and second-story dining halls have brick wainscots and buff plaster walls, concrete columns, and ceiling beams finished with walnut stain and flat varnish to give the effect of wood construction. The ceiling panels are covered with a sound-absorbing acoustical material having an exposed surface of perforated metal, which is effectively decorated. All the dining halls have brown linoleum floors with black linoleum borders. The serving rooms and dish-washing rooms have walls of light-gray glazed brick, and floors of terrazzo. The win-



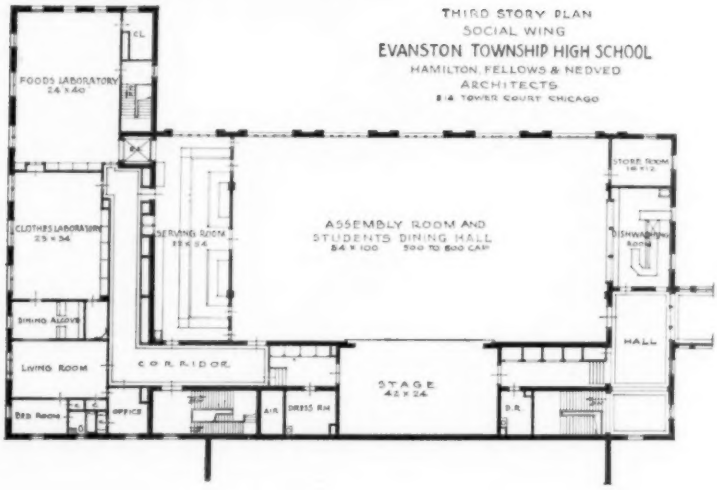
FLOOR PLAN OF THE STUDENTS' MESS HALLS, NEW TRIER TOWNSHIP HIGH SCHOOL



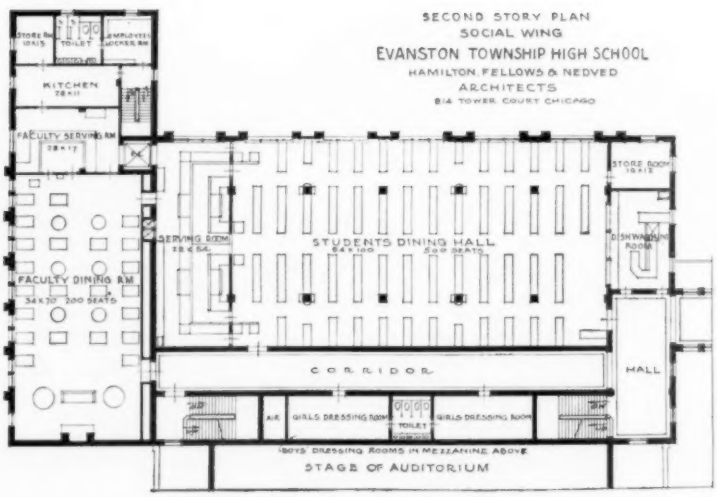
THE SOCIAL WING OF THE EVANSTON TOWNSHIP HIGH SCHOOL, EVANSTON, ILL.

(See page 306 for the first story plan)

THE THIRD STORY PLAN



THE SECOND STORY PLAN



ONE OF THE THREE SERVING ROOMS IN THE EVANSTON TOWNSHIP HIGH SCHOOL

THE SECOND STORY DINING HALL, WHICH IS SIMILAR TO THAT ON THE FIRST FLOOR

THE MAIN KITCHEN OF THE EVANSTON TOWNSHIP HIGH SCHOOL

dows are of steel and all are protected with screens.

The faculty dining room on the second floor is a very hospitable room with leaded casements, high-paneled oak walls and a stone Gothic fireplace. It is provided with its own cafeteria serving room, supplied either from the main kitchen on the first floor or from a special kitchen adjoining it. On the third floor, above the faculty dining room, is the household arts department, which consists of a small housekeeping suite, a clothes laboratory and a foods laboratory.

The third-story dining hall, at present reserved for other uses, is a room of noble proportions, without columns. The brick walls are of a pinkish-gray color, and the panels of the high plaster ceiling are covered with acoustical material. There is a large stage with modern equipment suitable for dramatic, music and lecture hall purposes, and a projector room for motion pictures. A storeroom is provided in which tables and chairs can be placed when the floor is cleared for dancing.

Convenient Kitchen Arrangements

The kitchen on the first floor is so placed as to supply all serving rooms, either directly or by electric dumbwaiters and elevator. It is a large, well-lighted room with glazed brick walls and tile floor, with all ranges and cooking equipment on raised tile platforms. A large bakery of similar construction adjoins one end of the room. All cooking equipment is operated by gas.

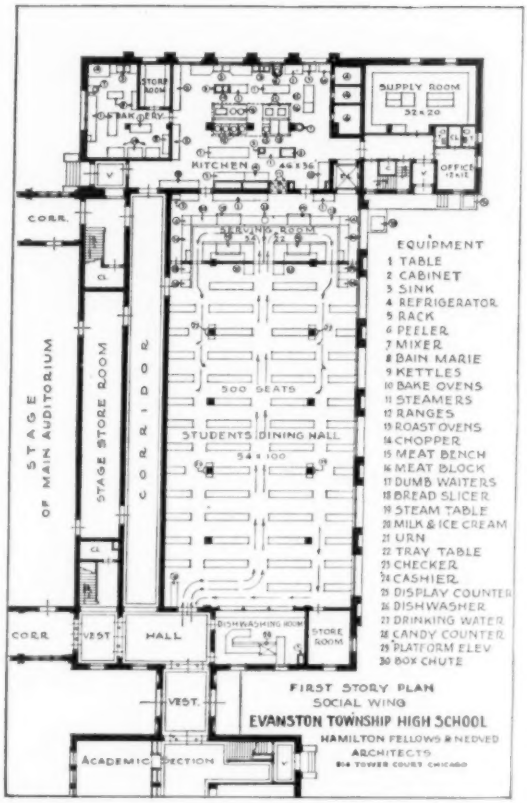
Mechanical refrigeration is applied to the cooling rooms and refrigerator boxes by a central plant located in the basement. Separate refrigerating units with ice cream cabinets are installed where lower temperatures are required. Cooled and filtered drinking water is supplied.

Adjoining the kitchen, at the opposite end from the bakery, is a large storeroom with steel shelving for dry groceries; a chute for waste boxes, paper and packing leads from it to a fireproof waste storage room in the basement. Garbage is removed daily by a collector and fed to hogs.

The equipment of the kitchen, bakery and serving rooms is of the most advanced design and construction. The serving counter tops are of glass, and all sinks, dishwashers and polished metal work are of nickel steel. The equipment and furnishings of the social wing were installed at a cost of $90,000.

Large-Scale Operation

At present a program of three lunch periods is in effect, and 2,350 meals are served daily, on the average, at an average price of 22 cents per person. The maximum daily capacity of the plant on a program of three sittings is 6,000. Operation of the cafeteria requires the services of a manager and a staff of 34 full-time and 18 part-time employees.



THE FIRST STORY PLAN OF THE SOCIAL WING OF THE EVANSTON TOWNSHIP HIGH SCHOOL

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

Acoustical Treatment and Insulation—Johns-Manville Corp.
Cafeteria Equipment—Duparquet, Huot & Moneuse
Face Brick—The Sugar Creek Clay Products Co.
Flooring—Congoleum-Nairn, Inc.
Heating System—American Radiator & Standard Sanitary Corp.
Heat Regulating System—Johnson Service Co.
Linoleum Top Tables for Dining Halls—Gunn Furniture Co.
Metal Doors—Dahlstrom Metallic Door Co.
Plumbing Fixtures and Sanitary Equipment—James B. Clow & Sons
Refrigerating System—Burge Ice Machine Works
Roofing—The Barrett Co.
Valves—Sloan Valve Co.
Ventilating System—American Blower Corp.
Terra Cotta—American Terra Cotta Co.
Windows and Sash—International Casement Co., Inc.

WESTINGHOUSE ELECTRIC AND MFG. CO.

EAST PITTSBURGH, PENNA.

Sales Offices and Locations in more than 110 Cities throughout the United States
For Lighting Equipment and Panelboards, See Pages 84, 85
For Athletic Field and Swimming Pool Lighting, See Page 265

COMMERCIAL COOKING EQUIPMENT

BAKING AND MEAT ROASTING OVENS

Westinghouse sectional bake ovens have many features, the value of which can be readily recognized. The ovens are of the hearth type and are built in sections.

BAKE OVEN, 2-SECTION CAPACITY

In operation, each deck is independent of the other decks and has separate, automatic heat control. Thus, products requiring different baking temperatures may be baked in adjacent sections at the same time.

Each section has separate top and bottom heaters, control switches and tile hearth. A complete oven has either one, two or three sections, a bottom panel and a stand of suitable height.

The unique construction accounts for the high efficiency and long life of the Westinghouse Bake Oven. The outer walls are made of heavy lead-coated sheet steel; the inner lining of rust-resistant sheet steel supported by a welded bridgework of angle-iron; the space between the walls is packed with rock-wool heat insulation. Practically all of the heat generated is kept within the baking chamber.

HOTEL TYPE RANGE 4-FOOT SECTION

Sections are made in five sizes, with capacities 10, 20, 40, 60 and 90 one-pound loaves of bread. Large sizes can be furnished on special order.

Westinghouse sectional meat roasting ovens are made in capacities to meet all requirements from the small restaurant or tea room to the largest hotels or cafeterias. Construction identical with the bake ovens makes possible a combination of baking and roasting ovens serving a very definite need.

These roasting ovens will pay for themselves in a comparatively short length of time, due to the reduced shrinkage of meats in this type as against the fuel types. Three sizes of ovens are available, each of one- or two-section capacity, sections being furnished in 60, 125 and 250-pound sizes.

COMBINATION OVENS

Meat roasting and baking sections are interchangeable. Thus any oven can be made into a combination with one or more meat roasting sections as desired.

HOTEL TYPE RANGES

The Westinghouse three-foot and four-foot section Hotel Type Ranges are built to meet economically all demands for heavy-duty service operation in cafeterias and institution kitchens. The ranges are made entirely of heavy steel with welded frame construction, and are built to give lasting service over a long period of time.

HOTEL TYPE RANGE 3-FOOT SECTION

The three-foot section range is suitable for duty in small kitchens where the four-foot section is not required. Small institutions find this range very adaptable where compact design and durable construction are desired.

The roasting oven in both ranges is equipped with top and bottom heaters adaptable for either roasting, baking or broiling. Ovens can be supplied with either automatic or non-automatic control.

The cooking surface of the four-foot section consists of four cooking plates; the three-foot section two cooking plates, surrounded in each case by a belt of brushed steel trim. These plates are supported by angles and are leveled so that the top is a smooth surface.

All heating units are controlled by three-heat reciprocating snap switches separately fused, giving maximum flexibility of heat control and permitting different operations at one time.

In order to do direct surface cooking alone, a Westinghouse four-foot section cooking top is provided. The cooking top is identical to that of the range with the exception that instead of the oven, a space, divided into two equal sections with a shelf, is provided below the cooking surface for storing pans, etc. A standard black-japanned sheet steel plate shelf can be furnished with all ranges and cooking tops.

HOTEL TYPE BROILER

HOTEL TYPE BROILER

This Electric Broiler is designed to insure convenience of operation, low operating costs and long life. The frame work of the broiler is of structural steel, well braced with welded joints, making a very rigid construction. Body is heavy grade sheet steel black-japanned with polished steel trim.

Listed in the Westinghouse Commercial Cooking Catalog 280.

Broiler is made in two sizes: capacity of small,

8 kilowatts; capacity of large, which is supplied with a roasting oven, is 18 kilowatts.

NEW ELECTRIC FRY KETTLE

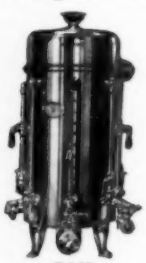
12" X 20" FRY KETTLE

The new Westinghouse electrically-operated fry kettle is so efficient that it will actually pay for itself in a short time through savings in fat consumption. This kettle maintains such accurate temperature control (only possible with electricity) that the fat does not break down and absorb food particles. Consequently there can be no transfer of taste or odor, and the same fat can be used over and over again to fry doughnuts . . . onions . . . potatoes . . . or whatever the order calls for.

This Electric Fry Kettle is so compact that it requires less than five square feet of floor space even for the largest size . . . can be tucked into any convenient corner. Three models, 60 to 90-pound fat capacity, 4.5 to 11.25 kw. electrical capacity. Furnished complete and ready for action, with wire mesh baskets, supporting screen, and kettle cover. Special screen for doughnut frying optional. Made of heavy cold rolled steel, thick insulation of rock wool, handsomely finished in battleship gray.

COFFEE URNS AND STANDS

The Westinghouse electric urn is a combination coffee and hot water urn consisting of two compartments, one for hot water and one for coffee. Coffee cannot be made until the water boils and this boiling water is then sprayed over the ground coffee. The automatic re-pouring feature of this urn then permits the coffee to be re-poured over the grounds to extract the full flavor and strength from them.



SAN FRANCISCO COFFEE URN

The urn body is made of very heavy copper, nickel-plated and polished. The coffee container is made of heat-resisting glass in the smaller sizes and Monel metal in the eight and ten-gallon sizes.

The stands combine an electrically heated cup warming space with a solid base for the urn itself. The frame is constructed of angle iron, rigidly braced, while the body is of aluminum-coated steel and all trim of Monel metal.

ELECTRIC GRIDDLES

ELECTRIC GRIDDLE

Westinghouse electric griddles are suitable for both continuous and intermittent operation in cafeterias and institution kitchens. The griddles are made in two sizes with bodies of heavy sheet steel. The feet are cast iron; the legs and switch box are black-japanned and the body is polished nickel plate. Griddles have cast iron tops with heavy grease grooves around the outside edges.

The 20" griddle has one heater, while the 38" has two, each covering one-half of the top area. Each heater is controlled by a three-heat reciprocating snap switch.

ELECTRIC HOT PLATES

ELECTRIC HOT PLATE

The Westinghouse hot plate is in reality a small electric stove suitable wherever high temperature cooking units are needed. The two 1800-watt heating units are of the enclosed type, 8" in diameter, each controlled by a three-heat snap switch.

The body is of black japan including switch box, top and legs of chromium-plated steel. Rugged construction and attractive appearance are features of this device.

Listed in Commercial Cooking Catalog 280.

MICARTA TRAYS

For Cafeterias and Laboratories

These trays, unlike metal trays, are light in weight, easily kept hygienically clean and therefore are exceptionally well suited for use in school and college cafeterias and restaurants.

MICARTA TRAY

Also because alcohol, moisture, most acids and alkalis have no effect on Micarta trays, they are used in laboratory work where ordinary trays prove unsatisfactory.

Micarta trays have a smooth satin finish that time and use will not mar. Made in straight grain or burl walnut, curly maple, black and in fancy decorative designs: 9½ x 12½ in., 10¾ x 13⅞ in., 13⅝ x 17⅝ in., 15⅜ x 20¾ in., 16½ x 22½ in.

DOMESTIC RANGES

DOMESTIC RANGE TYPE C-831

Westinghouse makes a complete line of domestic electric ranges which, because they represent the latest advance in modern automatic electric cookery, are ideal for diet kitchens, home economics, laboratories, and the like.

Listed in Electric Range Catalog 281.

For Interior Lighting Pages, see 84, 85.

The Westinghouse Refrigerator maintains perishables at perfect refrigeration temperatures. Losses due to food spoilage and shrinkage are lowered because moisture is always retained in the proper amount for maximum freshness. The Westinghouse pays for itself many times over in food savings and efficient, economical year-after-year performance.

Dual-Automatic Control—All the Westinghouse refrigerating equipment has this exclusive feature. Seven-point Temperature Selector provides automatic control under normal conditions. Built-in Watchman Thermostat provides automatic control under extreme conditions. Eliminates the need for fuses or cut-out switches.

Commercial Storage Cabinets—16 different models—11 finished in porcelain throughout; 5 with porcelain fronts, lacquer sides, galvanized steel linings. All porcelain models have electric lights—adjustable shelves. Available in 27, 44, and 68 cubic foot sizes. Six glass door models. Four models with full-length meat doors.

Domestic Refrigerators—Made in a wide range of sizes for the small or large kitchen. Deluxe models have built-in crisping pan, rolling shelf, electric lighted interior. Broom-high legs, buffet top, arm-high temperature selector, hermetically-sealed unit on all models.

Biological Cabinets—For storing perishable biological products, chemicals, test samples, and the like. Construction makes possible numerous combinations to meet the needs of all kinds of laboratories. Adaptable to different sizes of Westinghouse Refrigerators.

Ice Maker—A special **Dual-automatic** Refrigerator designed to freeze large quantities of ice cubes quickly and to store them for future use.

Water Coolers—Available in both bottle and pressure types with Micarta or Steel Cabinets. Bottle cooler may be moved from place to place and plugged in the nearest electric outlet. Pressure cooler connects direct to the building water supply line. Cost less to operate than a 50-watt lamp. Provide healthful, energizing water always at the proper temperature.

MODEL MB-5

Capacity—Four gallons of 50-degree water per hour, using 80-degree inlet water.

COMMERCIAL STORAGE CABINET AP-683

Cabinet Dimensions in Inches—Width 18⅞; depth 18⅞; height overall 54½.

MODEL CMB-4

Capacity—3.8 gallons of 50-degree water per hour, using 80-degree inlet water.

Cabinet Dimensions in Inches—Width 18⅞; depth 18⅞; height overall 54½. Beverage compartment—width 5; depth 12; height 12.

MODEL MT-8

Capacity—Four gallons of 50-degree water per hour for glass-filling service; 7.1 gallons per hour for bubbler service with pre-cooler, using 80-degree inlet water.

Cabinet Dimensions in Inches—Width 18⅞; depth 18⅞; height overall 43.

MODEL CMT-4

Capacity—3.8 gallons of 50-degree water per hour, using 80-degree inlet water.

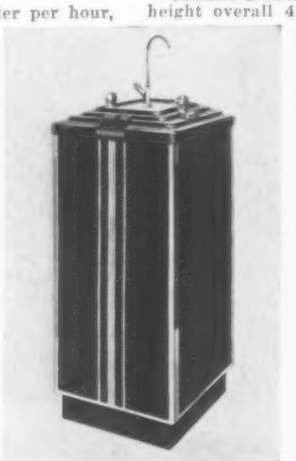
Cabinet Dimensions in Inches—Width 18⅞; depth 18⅞; height overall 41 3/16. Beverage compartment—width 5; depth 12; height 12.

MODEL WT-501

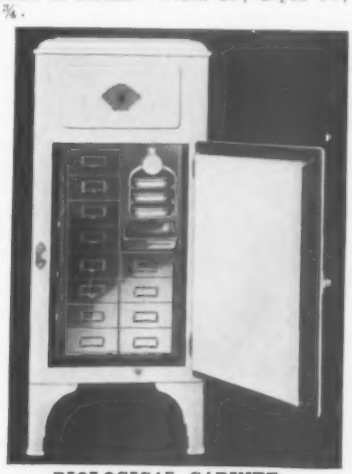
Capacity—5.8 gallons of 50-degree water per hour, using 80-degree inlet water.

Cabinet Dimensions in Inches—Width 25; depth 21; height overall 40¾.

DOMESTIC REFRIGERATOR AP-73



WATER COOLER MT-8



BIOLOGICAL CABINET

GENERAL ELECTRIC COMPANY

ELECTRIC REFRIGERATION DEPARTMENT

Hanna Building, Section BU

Cleveland, Ohio

CONDITIONED AIR

COMMERCIAL REFRIGERATION

costs **25% LESS** *to operate*

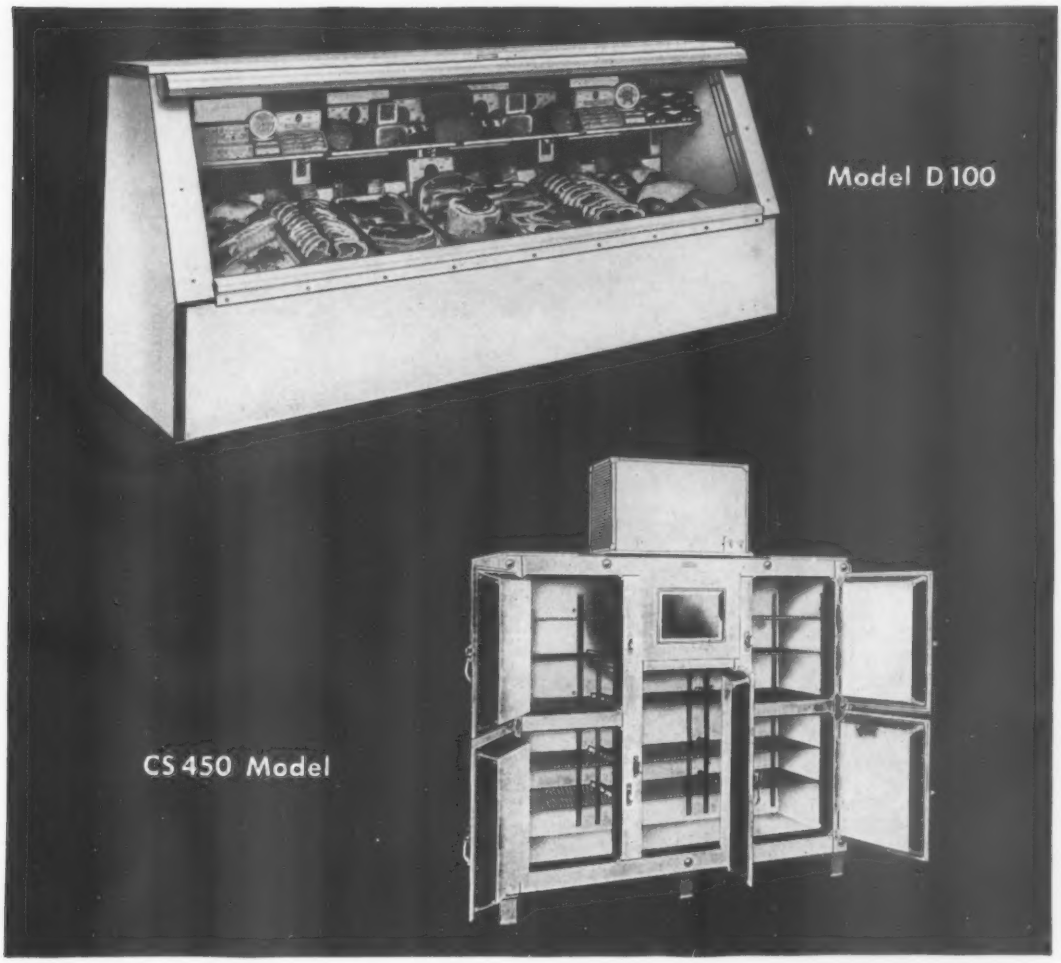
CONDITIONED AIR Commercial Refrigeration — General Electric's great new development—costs 25% less to operate than any other method of bulk food preservation.

And it does a more complete job! *All* the air in the cabinet is washed at least five times every minute, then circulated by force through every part of the cabinet. Passing over and around foods, it cools them *five times faster,* absolutely eliminating any possibility of odor or taste transference.

By keeping fresh foods fresh, Conditioned Air Refrigeration ends expensive trimming of meats and vegetables. Loss by shrinkage is cut to the very minimum. The scientifically correct ratio of 36°-40° (Fahr.) with relative humidity of 80%-85% is constantly and automatically maintained.

Available in storage cabinets and display cases; storage models either with remote installation or as "packaged unit." All have the G-E sealed-in-steel compressor mechanism, carrying the famous G-E 4-Year Service Plan—your guarantee of *lowest cost refrigeration.*

General Electric Company, Electric Refrigeration Department, Section BU, Hanna Building, 1400 Euclid Avenue, Cleveland, Ohio.



● Keeps fresh food fresh for days ● Ends trimming of meats & vegetables

● Cools foods five times as fast ● Costs 25% less to operate . . . . .

● No odor transfer . . . .

conditioned air

GENERAL ELECTRIC

COMMERCIAL REFRIGERATION

THE AMERICAN SCHOOL AND UNIVERSITY

JOHN SEXTON & COMPANY

Established 1883

EDELWEISS QUALITY FOODS

CHICAGO
500 N. ORLEANS STREET

BROOKLYN
65 IMLAY STREET

FOOD SUPPLIES *for* EDUCATIONAL INSTITUTIONS

QUALITY
VALUE
SERVICE

The institutional buyer demanding value insists that to have value quality must be maintained. This uncompromising attitude has resulted in careful and scientific analyses. It has developed a fine appreciation of the economy of better foods. Better foods mean increased efficiency and more satisfied guests and pupils.

Nearly fifty years of specialized service in the supply of Hotels, Restaurants and Institutions has enabled us to know something of the problem confronting institutional buyers. Out of this knowledge and cooperation, we have evolved an assortment of foods particularly suited to their individual requirements. Our Edelweiss label has become the symbol of fine foods economically packed; our quotations are received with interest wherever close and intelligent buying prevails.

The service of our Dietetic Department is available to you. Through the solution of the problems of other institutions, we may have immediately available information particularly helpful to you. We invite you to use this service.

AMERICA'S LARGEST DISTRIBUTORS
OF NUMBER 10 CANNED FOODS

THE AMERICAN SCHOOL AND UNIVERSITY

JOHN SEXTON & COMPANY

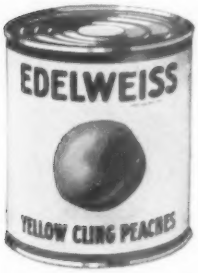
Established 1883

EDELWEISS QUALITY FOODS

CHICAGO
500 N. ORLEANS STREET

BROOKLYN
66 IMLAY STREET

All of Sexton's Canned Fruits are equally delicious. All are allowed to completely ripen in the sun before being picked. Each fruit is obtained from the locality where it grows best—and then only the choice of the crop is taken. Packed in No. 10 tins, the container most economical for school cafeteria use.



If you went into the finest garden and selected the vegetables to serve your pupils you could find no better than those which come to you packed under the Edelweiss label. Each vegetable distributed by Sexton is selected where soil and climate are best suited to its perfect production. Picked at just the right time, and packed on the spot, they reach you retaining all the vitamin value, full flavor and succulence of the fresh vegetable.

Delicious preserves, jellies, marmalades and fruit butters, made in Sexton's Sunshine Kitchens, are of excellent quality because the materials from which they are made — selected fruits and cane sugar — are the finest obtainable. They are made with great care, in small quantities, giving them the beautiful color and the delicious appeal of home made preserves. In our Sunshine Kitchens we also prepare a complete assortment of pickles, relishes and condiments of quality. Edelweiss mayonnaise dressing, catsup, mustard and chili sauce are packed in handy gallon glass bottles.

Among other Edelweiss Foods particularly popular with school cafeterias are: Coffee, individual tea, cocoa, gelatine dessert, chocolate pudding, peanut butter, macaroni, spaghetti, canned fish, paper napkins and paper specialties, Edelweiss No. 10 can soups, dried fruits and tapioca.

If one of our representatives has not called on you please write us.

COFFEE IMPORTERS — BLENDERS AND ROASTERS

THE ALUMINUM COOKING UTENSIL CO.

New Kensington, Pa.

Oakland, Calif.

BRANCHES

Baltimore, Md. Boston, Mass. Chicago, Ill. Cincinnati, Ohio Cleveland, Ohio E. St. Louis, Ill. Kansas City, Mo. Los Angeles, Calif. Minneapolis, Minn. New York, N. Y. Philadelphia, Pa. Portland, Ore.

"WEAR-EVER" GAS HEATED STEAM-JACKETED KETTLE

This kettle is ideal for use where cooking must be done for a large number of persons, but where steam is not available the year 'round. It will do everything expected of a regular Steam-jacketed Kettle operated on a steam line.

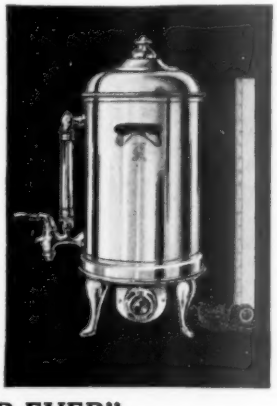
About 60 minutes are required to bring water to boiling point and create steam in the 60-gallon size of this type kettle. Made in ten sizes from 10 to 100 gallons capacity.

"WEAR-EVER" ELECTRIC PERCOLATING COFFEE URN

This "Wear-Ever" Urn is made entirely of hard, thick, sheet aluminum. Fittings are of nickeled brass; handles of Bakelite.

Urn operates on percolator principle and is equipped with electric unit for operation on regulation lighting current. Equipped with switch for "high," "low" and "medium" heat.

Made in one size —9 quarts capacity.



"WEAR-EVER" ALUMINUM TRAY

This is the tray that is used so extensively for cafeteria service. Hard, thick sheet aluminum it withstands knocks and bangs of hard service. Size top outside 18¾" x 12⅞"; depth ½".

"WEAR-EVER" RANGE UTENSILS

The "Wear-Ever" line of heavy-duty aluminum ware includes everything needed in the form of range utensils—sauce pans, sauté pans, stock pots, etc.—all made of thick, sheet aluminum, every utensil stamped from single piece of metal without joints or seams and with extra thickness of metal where needed to resist wear.

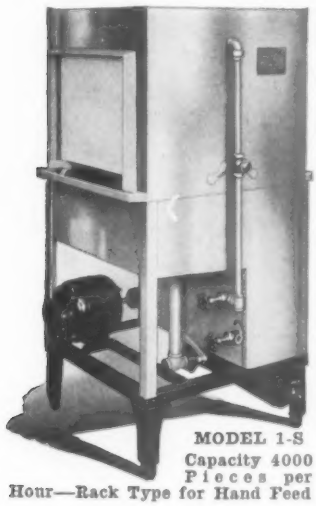
For full information regarding these "Wear-Ever" utensils, see your regular supply house, or write for catalog.

CHAMPION DISHWASHING MACHINE CO.

Main Office and Factory
Erie, Pennsylvania

CHAMPION DISH WASHING MACHINES

For school and college cafeterias and kitchens, from the largest to the smallest, the CHAMPION Dish Washing Machine Company offers a wide range of models from which to select that model which will meet requirements as to size, capacity, speed, finish and price. Capacities range from 2500 to 21,000 pieces per hour, and the price range is from $395 to $2695.



MODEL 1-S
Capacity 4000 Pieces per Hour—Rack Type for Hand Feed

The two models shown on this page are our **Model 1-S** for the small kitchen, with a capacity of 4000 pieces per hour, and our **Model 400-A** for the large school kitchen feeding 1000 to 1500 per meal, capacity 10,000 pieces per hour.

The small machine, Model 1-S, has a number of worthwhile features, including adjustable legs, automatic overflow with outside drain control, and removable spray pipes. It is fitted with curtains for straight-through automatic operation. Models 1-SD and 1-C are of the same size, but are fitted with doors for those who require that type of machine.

The larger machine, Model 400-A, is the first conveyor type machine to be offered in the galvanized iron finish. Its wide conveyor and tremendous spray action afford greater capacity and speedier and more efficient washing operation.

All machines are available in **galvanized iron, copper** and **Monel Metal** or **stainless steel.**

Cleaner Dishes in Shorter Time

The straight, stationary sprays of all CHAMPIONS insure cleaner dishes in shorter time. The controlled direct action of the hot, soapy spray, with its forceful, steady, ten-pounds-to-the-square-inch pressure, strikes every part of each dish and quickly removes every spot of dirt and grease. The spray pipes above and below are quickly and easily removed, cleaned and replaced by hand. CHAMPIONS have no complicated revolving mechanism — no moving parts to wear down or get out of order. Once you see a CHAMPION in action, you will appreciate why it is chosen by those who must have efficient, economical and unfailing performance.

CHAMPION Advantages:

Sturdy Construction—Built to give lifetime service. Tanks specially constructed of ½-inch-thick cast iron, galvanized to prevent rust.

Greater Speed—All unnecessary movements, of either operator or machine, are eliminated.

Lower Costs—A minimum of labor (unskilled) is required. Special features almost entirely eliminate dish breakage.

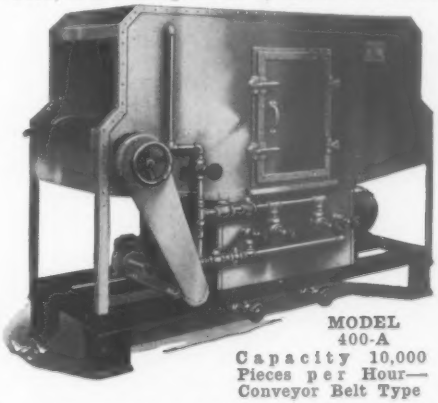
Dependable Service—All CHAMPIONS give steady, continual, dependable service. Every part is easily accessible for cleaning. CHAMPION Service Stations are located in most large cities.

Large Selection—There are models to fit every requirement, in capacities of from 2500 to 21,000 pieces per hour—rack type for hand feed, rack type with chain carrier, and conveyor type—galvanized iron, monel metal or copper construction. **Write for booklet.**

A Few of the Many CHAMPION Installations:

Riverside High School, Buffalo, N. Y.
South Side High School, Milwaukee, Wis.
University of Rochester, Rochester, N. Y.
Toronto University, Toronto, Canada
Emory University, Emory, Ga.
Rhode Island College, Providence, R. I.
University of Maine, Orono, Me.

Note: The famous new Waldorf-Astoria Hotel, in New York, is now being served by eleven CHAMPIONS.



MODEL 400-A
Capacity 10,000 Pieces per Hour—Conveyor Belt Type

Our representatives are available in various sections of the country, for planning and consultation service.

COLT'S PATENT FIRE ARMS MFG. COMPANY

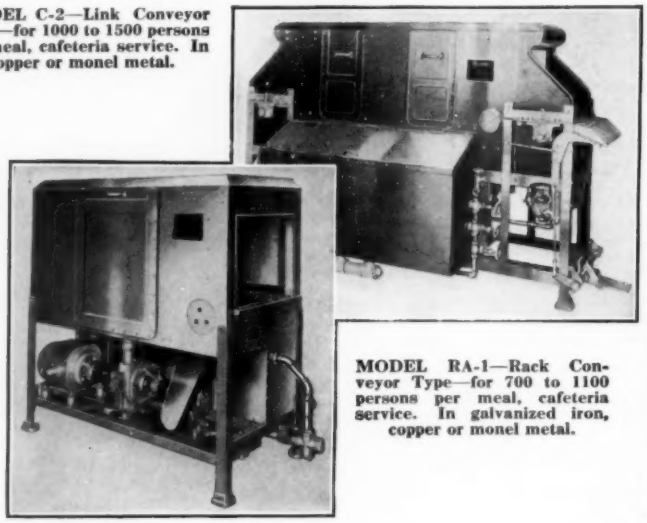
AUTOSAN MACHINE DIVISION

HARTFORD, CONNECTICUT

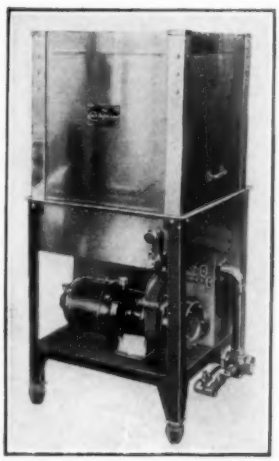
NEW YORK 20 Vesey Street	CHICAGO 626 W. Jackson Blvd.	CLEVELAND 2924 E. 132nd Street	DETROIT 5315 Nottingham Road
ST PAUL 416 Roy Street	PASADENA 72 Annandale Road	DALLAS Milam Hotel	ATLANTA 30 E. Lake Drive

COLT AUTOSAN DISHWASHERS

MODEL C-2—Link Conveyor Type—for 1000 to 1500 persons per meal, cafeteria service. In copper or monel metal.



MODEL RA-1—Rack Conveyor Type—for 700 to 1100 persons per meal, cafeteria service. In galvanized iron, copper or monel metal.



MODEL R-1—Single Rack Type—for up to 500 persons per meal, cafeteria service. In galvanized iron, copper or monel metal.

Dishwashing Machines for Every Requirement

Whether you serve 100 or 2000 students per meal, there is a sturdy, efficient, economical Colt Autosan Dishwashing Machine which will exactly fit your needs. The Autosan line is most complete, (there are nine models in all), and offers the greatest values—if you will believe the opinions of many of your associates in the school field. This year especially—with prices down, and values up—is an excellent time to buy new dishwashing equipment, or to replace old.

But above all—before you buy—learn why Colt Autosans are invariably made the basis for comparison whenever the subject of dishwashers is mentioned. A letter stating the number of students you serve will bring promptly—without obligation—a complete description of the machine or machines best adapted to your requirements. Write Colt's Patent Fire Arms Mfg. Co., Autosan Machine Division, Hartford, Conn.

Architects

Send for your copy of the complete Colt Autosan Architect's Portfolio which contains full information and specifications.

INCO MONEL METAL

ERIE RESTAURANT EQUIPMENT CO.

Erie, Pennsylvania

School authorities throughout the country are at all times endeavoring to improve the quality of food served at a price which the students can afford to pay and to give them all the body building minerals possible.

SAV-MOR
Saves The Flavor

Your cooking troubles will be greatly eliminated if you use the SAV-MOR system. SAV-MOR makes it possible for the people in charge of your eating departments to serve more attractive, better tasting, and more wholesome food. By eliminating the water in the process of cooking all vegetables, the important body-building elements are retained. This is very important for the development of the student. Cooking vegetables that are attractive and appeal to the eye, is another very important feature.

Low operating costs oftentimes make it possible to serve certain items for less money, which is a very attractive appeal to the students. SAV-MOR system of cooking will, without a doubt, give more service from a single unit than any other single item in the kitchen.

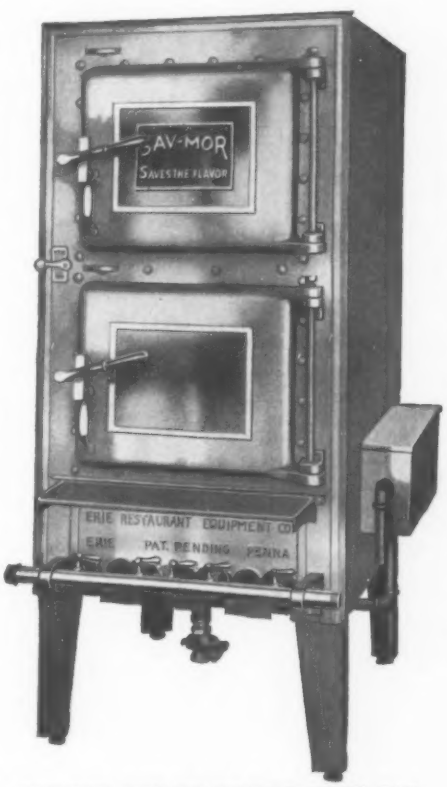
It will serve better food, requiring less floor space, less labor, and less fuel. It is designed for easy operation, which makes it possible for the most inexperienced help to operate.

Cooking compartments and utensils are constructed of Allegheny Metal, which eliminates all rusting and makes it easy for the operator to keep the unit clean with very little effort.

Don't overlook the fact that SAV-MOR roasting feature is found only in this unit. These exclusive features make this unit most satisfactory for every type and size of school requirements.

The SAV-MOR is being used by many of our prominent schools, universities and also by a very large number of our public schools.

We will gladly furnish complete specifications and a list of our many users upon request. Write for it today.

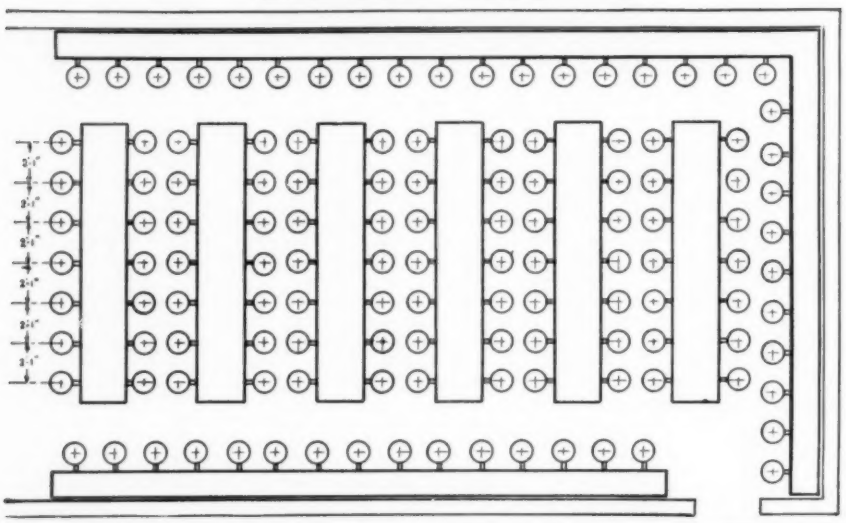


SAV-MOR CAN BE HEATED WITH GAS, STEAM OR ELECTRICITY

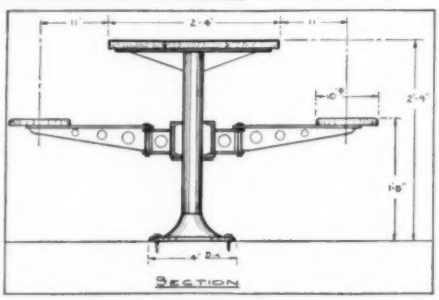
MARKET FORGE COMPANY

Everett, Mass., U. S. A. *Branches in Principal Cities*

TABLES WITH SWINGING SEATS



A TYPICAL TABLE AND SEAT LAYOUT



MAFORCO table and seating equipment as developed by our engineers is proving helpful to school and university authorities in laying out practical and economical cafeteria installations.

Remember these exclusive "Maforco" features:

- Conservation of floor area with swivel table seats allowing maximum accommodations
- Orderly seating without confusion
- Constructed for the reduction of noise
- Simple design with the elimination of corners and crevices to aid sanitation and economical maintenance
- Tables constructed of wood, covered with Monel metal, stainless steel or rubber, to accommodate all floor areas
- Clear space between seats minimum 12″, standard 2′ 6″

If you are planning a new cafeteria, or if your present equipment is inadequate, consult our engineers for complete layout.

Write us for complete specifications

REPUBLIC STEEL CORPORATION

Youngstown, Ohio

SALES OFFICES AND DISTRIBUTORS IN ALL LARGE CITIES

The application of Enduro, Republic's Perfected Stainless Steel, in schools and universities, relates to (a) its use as a decorative medium, exterior and interior, (b) its use wherever food comes into contact with metal, as in kitchen and cafeteria equipment, and (c) its use in laboratory service, in furniture and in vent hoods and ducts.

ENDURO
REPUBLIC'S PERFECTED
STAINLESS STEEL

Enduro stainless steel is an alloy containing nickel and chromium, a beautiful non-tarnishing white metal taking a high polish. It is the same corrosion-resisting metal all the way through with no surface coating to peel off or wear thin. It is impervious to the action of weather and is not subject to attack by most acids, alkalis, fumes, foods and dairy products. Wiping with a damp cloth restores the original silvery finish.

Its use as a decorative material is limited only by the imagination of the architectural designer. It can be used as trim around rooms, doors and windows, in stair rails, in lighting fixtures, in grilles, in spandrels, in many ornamental features, exteriors and interiors. And any ornamental metal worker can fabricate it.

The advantages of Enduro in food service are its beauty, the ease with which it may be kept clean, and its long life due to the fact that it is proof against corrosion. It is available in many fabricated utensils—pans, kettles, pressure cookers, etc.—and it is supplied in sheet form for fabrication into racks, table tops, shelves, etc. A list of manufacturers using Enduro in the making of such equipment will be supplied upon request.

On account of the ability of Enduro to resist acids, alkalis and corrosive gases it is ideal for laboratory equipment—hoods, ducts, cabinet shelves, tops of tables, desks, etc. Any sheet metal worker can fabricate hoods and ducts and similar parts on the job.

ENGINEERING SERVICE

The facilities of the largest and best equipped metallurgical laboratories in America, together with the experience and skill of a trained corps of Republic Metallurgists and Engineers, are at your service in working out any problem relating to the use of or fabrication of Enduro. Tell us your problems.

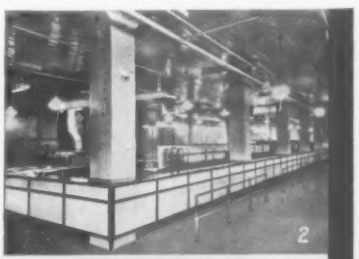
1. Kitchen equipment of ENDURO fabricated by Kirk Mfg. Co., St. Louis, Mo., for Bristol School, Webster Groves, Mo.

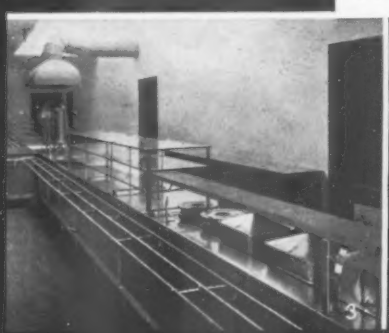
2. ENDURO equipped cafeteria, fabricated by Kirk Mfg. Co., installed in Hadley Vocational School, St. Louis, Mo.

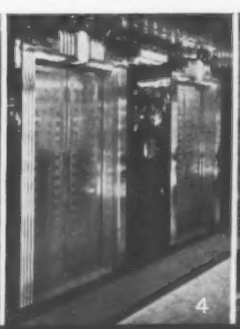
3. All table tops, counter tops, backs, shelves and tray rails in James Ford Rhodes High School, Cleveland, O., are ENDURO. Counter tops are ENDURO Plymetl made by Haskelite Corp.

4. A typical ENDURO Elevator Door Installation.

5. ENDURO Met-L-Wood table tops, made by Met-L-Wood Corp., Chicago, Ill., installed in Domestic Science Room, Parker Junior High School, Chicago.







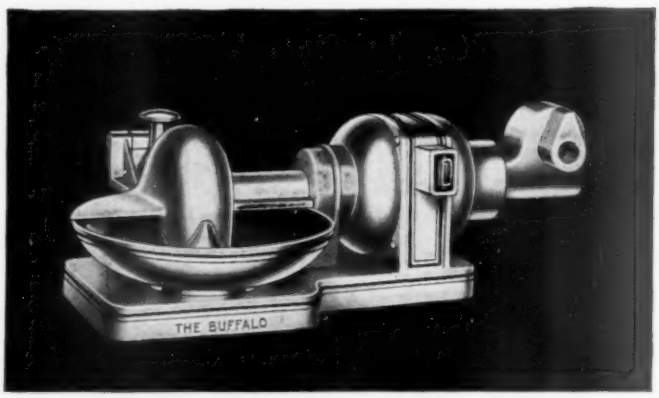
JOHN E. SMITH'S SONS COMPANY

50 Broadway, Buffalo, N. Y.

Pioneer Manufacturers of "BUFFALO" Food Choppers and Bread Slicers

THE IMPROVED "BUFFALO" FOOD CHOPPER

An Ideal Machine for School Kitchens



This improved Chopper will produce a better quality of chopped foods, practically eliminate food waste and save considerable time and labor in food preparation.

It chops all kinds of meats, fruits, vegetables and nuts FINE without mashing or squeezing out the nutritious juices. It is sturdily built; safe, simple and very quiet in operation. Takes up very little room. Beautifully finished.

Has exclusive safety features, knives are fully guarded; top plate and bowl are removable. Model 114 (illustrated) has capacity of 7 lbs.; ⅓ H.P. motor.

Furnished with Grinder for hamburg, sausage, meat loaf, etc., also vegetable slicer for slicing all kinds of vegetables, fruits, making French fried or Julienne potatoes, grating cheese, bread crumbs, etc.

"BUFFALO" Food Choppers are made in 4 sizes for use in small or large kitchens. Write for complete catalog and prices.

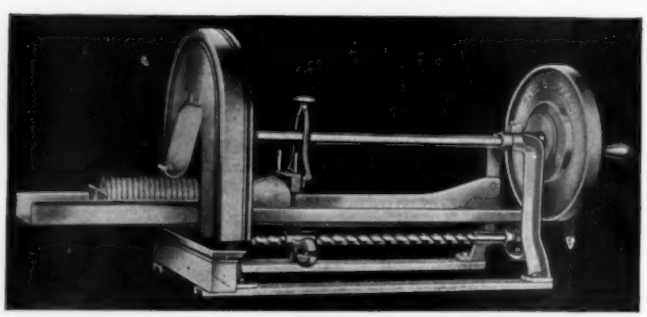
THE IMPROVED "BUFFALO" BREAD SLICER

This machine will save from 4 to 6 slices on every loaf of bread cut, over hand slicing. Cuts 175 to 200 uniform slices per minute from ⅛" to ⅞" thickness. All waste is eliminated because every loaf is cut down to the last slice and every slice is a uniform thickness.

Stacks the bread as it cuts, preventing it from drying out. Slices either hot or cold bread without crushing or crumbing.

The knife is fully guarded, making it absolutely safe for the operator. Equipped with safety lock which prevents the knife from turning when the slicer is idle. When locked, knife remains in top of hood, out of the way.

A "BUFFALO" Bread Slicer will pay for itself in a few months' time. Made in 4 sizes, hand or motor operated. Write for complete catalog and prices.



"BUFFALO" Food Choppers and Bread Slicers are in use to-day in hundreds of schools, as well as in hotels, hospitals, restaurants, clubs and institutions throughout the country. List of users upon request.

STANDARD GAS EQUIPMENT CORPORATION

18 East 41st Street, New York City

New York Philadelphia Baltimore Chicago Boston Birmingham

Pacific Coast Distributors

NORTHWEST GAS & ELECTRIC EQUIPMENT CORP.

Portland, Oregon

EXACTING REQUIREMENTS OF SCHOOL COOKERY . . . MET

100%

BY

VULCAN

GAS EQUIPMENT

VULCAN NO. 4751 All-Hot-Top Gas Range

The standard heavy-duty type range. Fast, economical, easy to operate and keep clean. Open or closed top, oven, insulation, heat control and salamander broiler are optional.

Several Models and Sizes

A typical school installation, St. Elizabeth's Home, West Hartford, Conn. No matter how large or small the school, VULCANS will fit it just right

WHAT is the secret of wholesome, appetizing low-cost school meals? Careful selection of foods? Yes, but that is not all . . . they must be properly cooked. The VULCAN All-Hot-Top Range with its great number of cooking heats and the VULCAN Bake Oven with its controlled heat make it easy for any cook to get results that make the mouth water.

Low costs are made possible by the VULCAN'S aerated burners, insulation, heat control and other patented features . . . and gas, the low-cost dependable cooking fuel.

Ask for Catalog and List of School Installations

At Right: **VULCAN No. 4712 Junior Gas Range.** *Has same construction and features as heavy-duty, but it is smaller in size. Takes less floor space*

At Extreme Right: **VULCAN No. 3761 Insulated Bake Oven** *with Heat Control for bread, pies, pastries, cake, macaroni, potatoes, puddings, etc.*

VULCAN NO. 4712

VULCAN NO. 3761

VULCAN EQUIPMENT MAKES GAS THE MODERN EFFICIENCY FUEL . . . CLEAN, FAST AND ECONOMICAL

THE AMERICAN SCHOOL AND UNIVERSITY

Section VIII

LABORATORY AND SHOP

The Science Building at Antioch College

By R. F. EASTMAN

Of Eastman & Budke, Springfield, Ohio, and Herbert Baumer, Architectural Department, Ohio State University

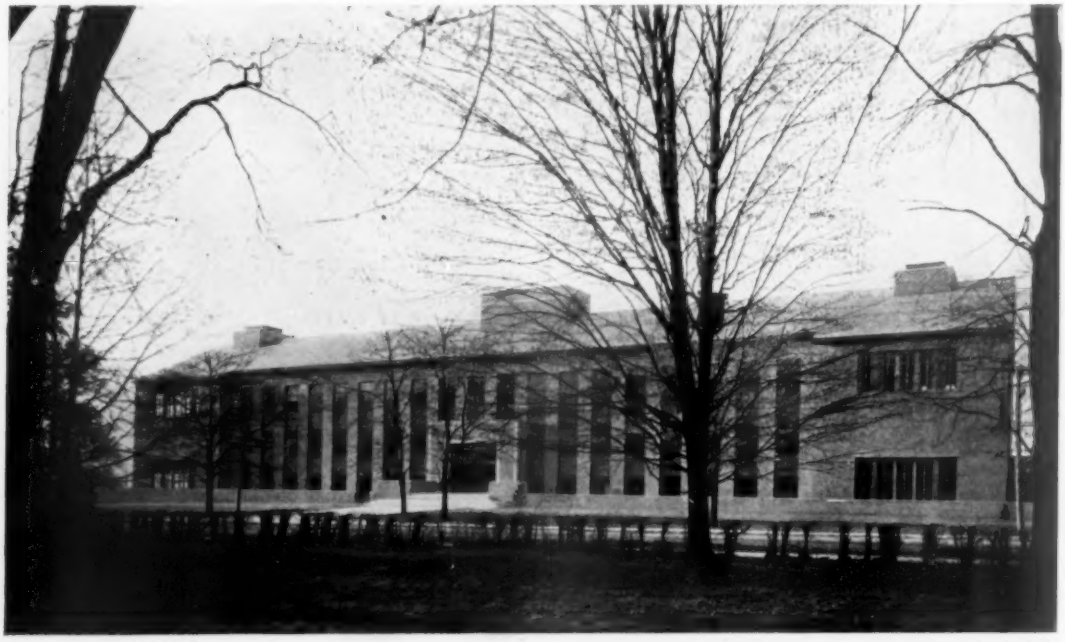
Architects Associated

THE problem of campus development at Antioch College presented the age-old difficulty of harmonizing tradition with modern requirements.

The college first opened its doors in Yellow Springs, Ohio, in 1852, with Horace Mann, its founder, as President. The original buildings, designed by a Boston architect, consisted of a central building of "imposing appearance"; two dormitories, "as plain parallelograms as Harvard and Yale could boast"; and a president's and professors' houses that still give a distinctively New England appearance to the little village of Yellow Springs.

After a few years of pioneering in the revolutionary ideas of "non-sectarianism" and "equal educational opportunity for men and women," Antioch experienced financial difficulties and for half a century was "just another small Ohio college." In 1921, however, Arthur E. Morgan, an engineer with an established reputation in flood prevention and reclamation work, was asked to resurrect the college. Unhampered by traditional academic ideas, he embarked on an adventurous, far-reaching enterprise. He believes that knowledge and growth come from practical experience as well as from books. The Antioch program combines learning from both in alternating periods of work and study.

The group of buildings erected by Horace Mann were reconditioned and remodeled by President Morgan and are now used for the purposes for which they were originally intended—the central building for administration and classroom purposes, and the two dormitories for housing the students. Funds available for building were spent for remodeling and modernizing, and for the erection of a library building, a men's dormitory, and a group of modern faculty residences. In 1928 a new Science Building, the



THE SCIENCE BUILDING, ANTIOCH COLLEGE

subject of this article, was made possible by a generous gift from C. F. Kettering, Vice-President of the General Motors Corporation and a warm friend and admirer of Mr. Morgan. Gifts from others enabled the completion of a new gymnasium and a power plant.

Design of the Science Building

To Professor Herbert Baumer of Ohio State University, retained by Mr. Morgan to consult with Eastman and Budke on the design and plan of the Science Building, must be given major credit for the general scheme and design of the building. The engineering mind of Mr. Morgan insisted on Quaker simplicity of design with practicality of plan. In this Mr. Kettering, another engineer, concurred. The resulting building is of a subdued modernistic character to conform with the simplicity of the older buildings.

The brick for the exterior enclosing walls is of the red sand mold type, similar in character to the brick of the original buildings. The spandrels under the windows are of black tile. The entrance steps are of St. Paul limestone, and the entrance door trim is of Oolitic Indiana limestone. Steel casement windows are used, and the roof is of unfading green slate.

Dimensions

The Science Building is rectangular in shape, approximately 62 feet wide by 262 feet long. It is three stories high in front and four in the rear. The height of a full story is obtained for the lowest or basement story by the installation of a wide moat in front and by grading at the rear. The roof is pitched in front but elevated at the rear to permit the top or third floor to have full ceiling height. A plenum tunnel, a mechanical equipment room and constant-temperature rooms are in the sub-basement. In the attic space under the pitched roof are ventilating equipment, the water distillery, and the geology storage room.

The size of the building was proportioned to the funds available. Courses in science are required of all students at Antioch, and space in the building was allocated to the various departments according to their relative importance in the curriculum.

Program or Plan

Five science departments are located in the building—physics, chemistry, biology, geology, and psychology. Laboratories of civil and electrical engineering are associated with the physics department.

The physics department occupies the west wing of the building on the basement and first floors. It is made up of laboratories in general physics, advanced physics, optics, and electrical measurements; a physics lecture room, seating 126 students; a classroom; two offices with associated private research laboratories; a machine shop; a dark room; two apparatus storage rooms; and a constant-temperature room located six feet in rock underneath the basement floor.

The chemistry department occupies corresponding quarters in the east wing of the building on the basement and first floors. It is made up of two freshmen laboratories; qualitative, quantitative, organic, physical chemistry, and metallurgical laboratories; three offices with associated private research laboratories; three dark rooms; an X-ray spectographic room; two balance rooms; a constant-temperature room similar to that in the physics department; a lecture room, seating 126 students; a lecture preparation room; an acid carboy room; and two stock-rooms.

The biology department occupies the second floor of the east wing of the building over the chemistry department. It is made up of laboratories in general biology, bacteriology, physiological chemistry, comparative anatomy, embryology, plant morphology, and a herbarium. There are also three offices, two of which have associated private research laboratories; a stock-room; two classrooms; a culture room; and a utility research laboratory. At the rear of the building are a greenhouse and an experimental animal house used by the biology department. The chemistry lecture room is available to the biology department.

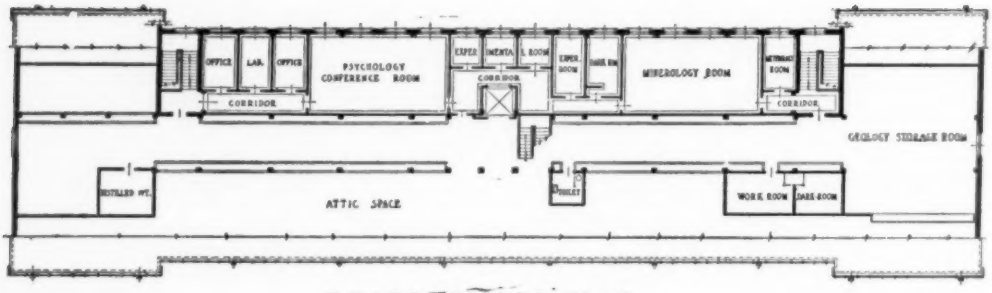
The geology department is over the physics department in the west wing of the building on the second and third floors. It is made up of laboratories in earth science, advanced geology, mineralogy, and meteorology. There is one office with private research laboratory adjoining; a conference room; a stock-room; two photographic dark rooms; a storage room for rocks; a storage room for astronomical and weather instruments; and an available platform on the top of the building. The physics lecture room is also used by the geology department.

The psychology department takes up the rear part of the third floor. It is made up of four small research laboratories; two offices; a large conference room; and a soundproof room. All these rooms can be darkened.

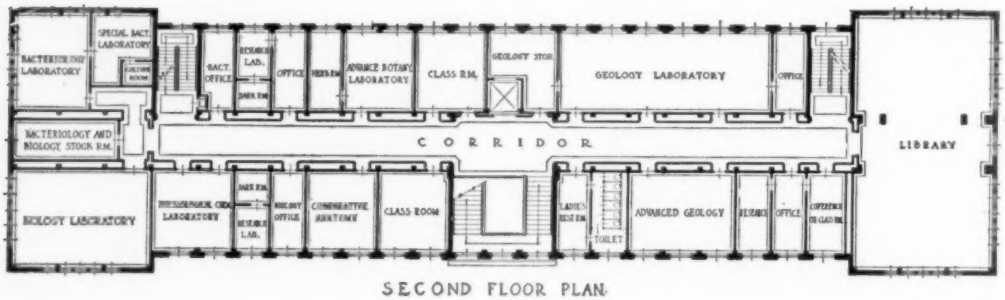
The science library, in which all science books are kept, occupies one large room on the second floor of the east wing. A science librarian is always in charge. The library's capacity at present is 8,188 books, and it can be expanded to accommodate 12,724 volumes.

Structural Features

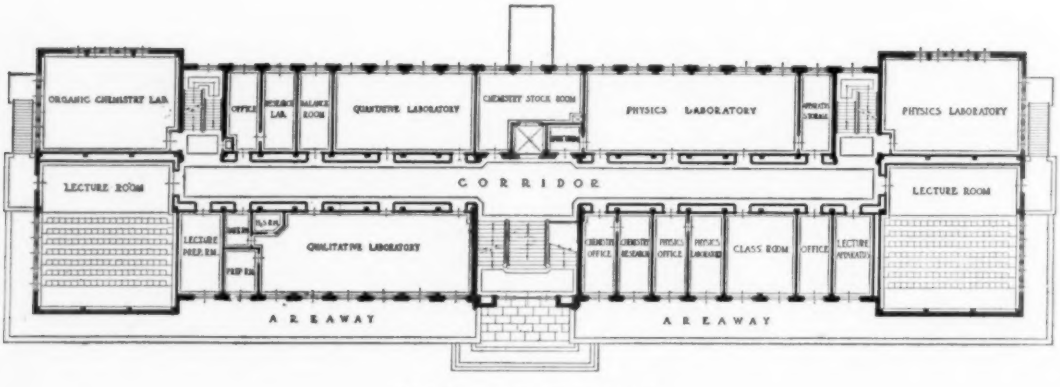
The loadings used in the building conform to Ohio State Code requirements and are consistent with good engineering practice: classrooms and laboratories, 60 pounds per square foot; corridors and lecture rooms, 80 pounds per square foot; and library and storage room floors, 100 pounds per square foot.



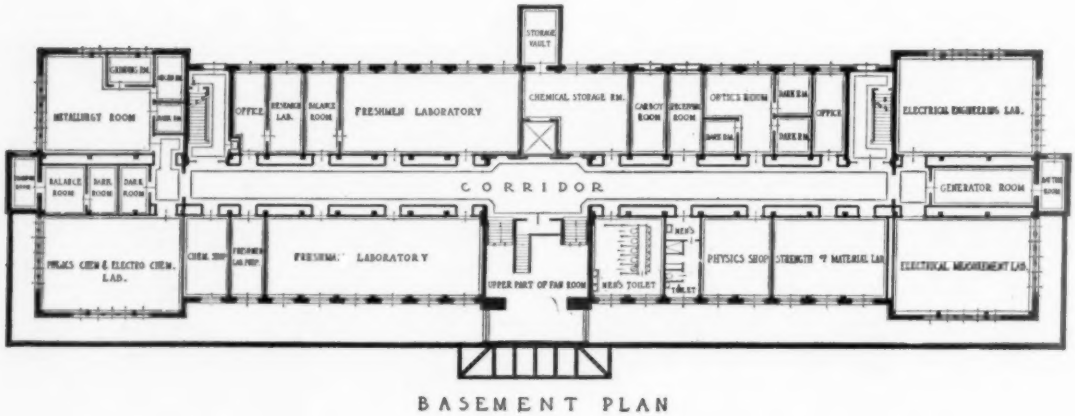
THIRD FLOOR PLAN



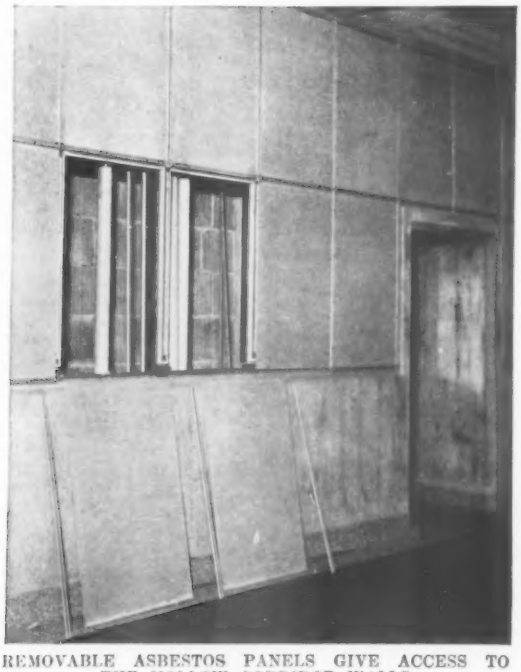
SECOND FLOOR PLAN



FIRST FLOOR PLAN



BASEMENT PLAN



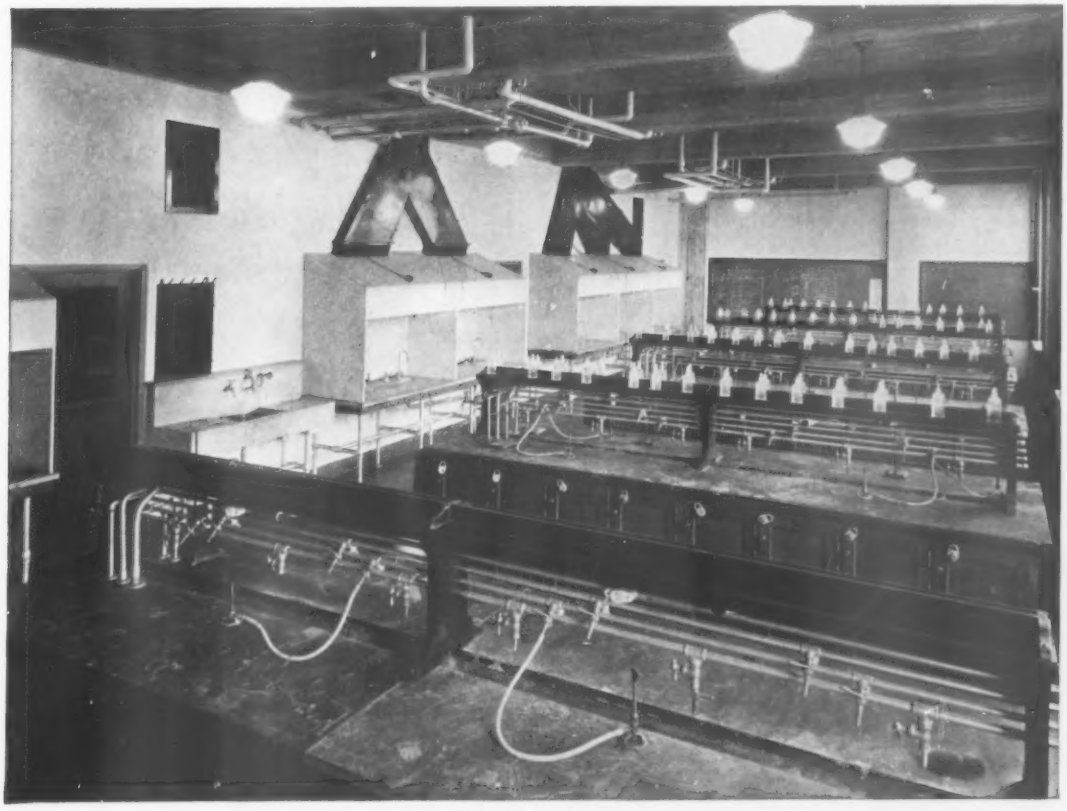
REMOVABLE ASBESTOS PANELS GIVE ACCESS TO THE HOLLOW CORRIDOR WALLS

The structural design is of the reinforced concrete skeleton type, with "beam and girder" construction. The use of cross-beams spaced 9 feet 6 inches apart, and monolithic slab floors, will permit future rearrangement and subdivision of rooms in multiple lengths of 9 feet 6 inches, by the addition or removal of partitions.

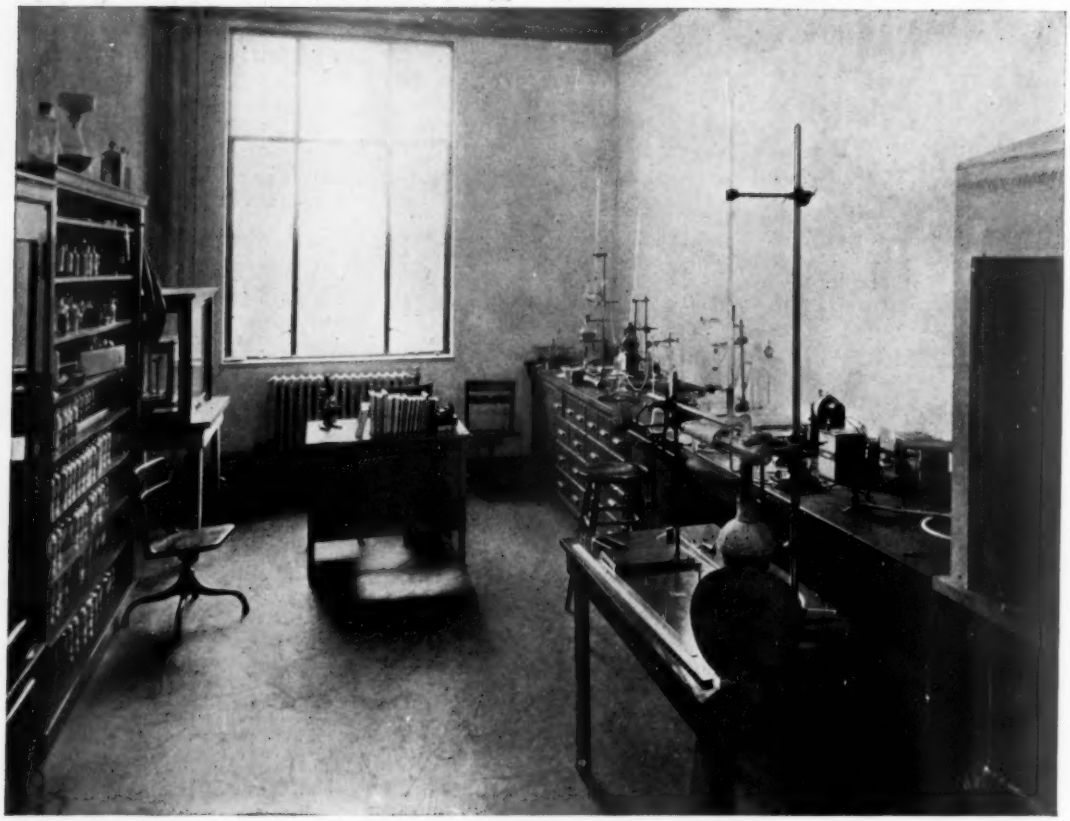
The exterior walls are backed up with common brick, and the interior partitions are of tile. The walls are plastered, but the ceilings are not. The beamed ceiling effect of the beam and girder design has proved very satisfactory. The ceilings of the lecture rooms were given acoustical treatment.

After thorough investigation it was decided to use mastic for the floor covering of all laboratories. Cement floors were used in a number of the basement and storage rooms. The library and corridors are covered with battleship linoleum.

One of the most unusual and novel features of the building is the design of the corridor walls. A corridor runs through the center of each floor, with room openings on both sides. The corridor walls are hollow (about two feet inside clearance), and house fume and ventilating ducts and all the vertical mechanical equipment services of the building. Doors opening on the corridors



A LABORATORY CLASSROOM
Each hood is operated by its own individual exhaust fan



A TYPICAL SMALL RESEARCH LABORATORY

are so located on the various floors that the hollow walls are continuous through the four floors of the building. From about four feet above the floor, the corridor sides of these walls are paneled with asbestos boards on a structural frame, each of these panels measuring about 2½ feet x 8 feet x ¼-inch. The panels are removable, allowing access to any part of the hollow wall. In fact, the walls are so designed that they can be completely removed, exposing all the mechanical equipment services housed therein. This method of wall construction permits unusual flexibility in repairing, removing, or adding new mechanical equipment service.

Mechanical Equipment

Electrical Work.—The various laboratories of the building are provided with current according to their needs, including 220-volt three-phase A.C., 220-volt single-phase A.C., 110-volt A.C., low-voltage D.C., and heavy-duty D.C. up to 400 amperes at 110 volts. A large power and transfer panel located between the electrical engineering and electrical measurement laboratories in the west wing of the basement floor controls the supply to the various laboratories. An emergency switch, mounted on this switchboard, throws the lighting system of the building on storage batteries in case service on the incoming power line is disrupted. The low-voltage current comes from 60 cells of box storage batteries.

Two motor generator sets, of 20-kw. and 6-kw. capacity respectively, supply the heavy-duty D.C. demand. The main switchboard is so connected with the various generators in the electrical engineering laboratory that the rest of the building can have the advantage of its output.

Plumbing Service.—The laboratories are supplied with hot, cold and distilled water, compressed air, gas, and waste lines wherever needed. Vacuum is obtained through the use of metal aspirators permanently attached to the cold water lines. Brass pipe is used for all hot water lines and block tin for the distilled water lines.

Located in the attic, an automatic steam-heated water still, with a 300-gallon storage tank, supplies distilled water for the building at the rate of 25 gallons per hour.

Heating and Ventilating Service.—Steam from the college power plant, reduced to 5 pounds pressure, heats the building through the use of radiators placed under windows of the various rooms.

A large fan, drawing in fresh air from the

outside, drives the air over a battery of indirect steam coils into the plenum tunnel. From there it passes to the various rooms through risers in the hollow corridor walls. Foul air, collected in the ventilator ducts in the attic, is vented out through two openings in the roof.

Hoods and Fume Ducts.—All laboratories are supplied with a modified form of the Cornell open-faced velocity hood. Twenty-eight motor blowers in the attic draw off the chemical fumes from the various hoods; a pilot light burns as long as the motor is running. No more than 12 feet of hood is connected to one motor. This arrangement gives a positive draft action on each hood, saves power, does not waste the warm air of a room in winter, and in general is very satisfactory. Complete control of a range of hood velocities from zero to 120 cubic feet a minute is achieved by means of a damper placed over the hoods and regulated by a chain.

Heavy-gage ingot iron was used for the fume-duct system. The entire system is made up in sections so that a worn-out section can be removed and repaired. The ducts were coated on the inside with three coats of varnish and one coat of asphalt paint. A removable section at the top of each riser permits the lowering of a spray paint gun into the riser when necessary.

As metal ducts are so much lighter than the conventional ceramic ducts, it was found possible to suspend the large collecting fume-ducts in the attic 8 feet from the floor, thus freeing attic space from the clutter ordinarily found in buildings using this system of ventilation. The weight of ceramic ducts usually also makes it necessary to install risers as a permanent part of the building. The permanency of installation does not allow a change in location or the installation of a new hood. With a hollow corridor wall, however, all fume ducts are accessible for repair, removal, or new installations. Another important advantage of metal over ceramic ducts is lower first cost. Metal ducts also permit a range of fabrication which is often desirable from the point of view of efficiency. Each fume duct has two dampers, one at the hood, as mentioned above, and the other next to the fume blower. The latter prevents fumes from being forced into other rooms in which hoods are not in operation.

Furniture.—The laboratory furniture was designed to meet the needs of the various departments. In fact, the building was designed largely around the furniture plan. The location of the chemistry locker units determined the window spacing. The windows are 9 feet 6 inches from center to center, making possible a 5-foot 6-inch aisle between the locker units. The furniture is of white oak stained brownish-green, with a rubbed finish. Stone table and desk tops are used extensively about the building. The chemistry locker units are supplied with acid-proof end sinks and traps. Heavy wrought-iron pipes are used for all vertical drains.

Dr. Clyde S. Adams, head of the Chemistry Department, was chairman of the Building Committee. The total cost of the building was $372,500.

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

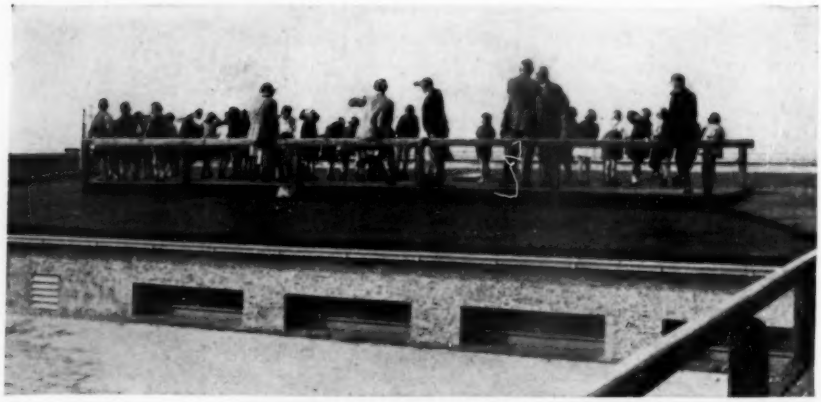
Acoustical Treatment—The Celotex Co.
Blackboards—Natural Slate Blackboard Co.
Exterior Building Materials—The Wyandot Clay Products Co.
Heating and Ventilating System—Warren Webster & Co.
Laboratory Flooring—Rezilite Mfg. Co.
Laboratory Furniture and Equipment—Kewaunee Mfg. Co.
Plumbing Fixtures—Standard Sanitary Mfg. Co.
Valves—Sloan Valve Co.
Windows and Sash—The Wm. Bayley Co.

Modern Equipment for Teaching Science in Poland

A PHYSICS LABORATORY IN A SECONDARY SCHOOL IN POZNAN, POLAND

This photograph from Poland and those from Germany on the following three pages are reproduced through the courtesy of Gerald S. Craig, Assistant Professor of Natural Sciences, Teachers College, Columbia University. The photographs were taken by Thomas F. Millbank

Photographs of Some of the Means Used to Make Science a Vital Subject in German Elementary Schools



A NUMBER OF NEW SCHOOL BUILDINGS MAKE USE OF THEIR FLAT ROOFS FOR INSTRUCTION

Classes are brought to the roofs to observe the location of industries, mountains, rivers and other geographical features. In some schools an astronomical observatory is maintained on the roof and is used at night

IN THE NEW SCHOOLS THE CORRIDORS ARE USED FOR VARIOUS INSTRUCTIONAL PURPOSES

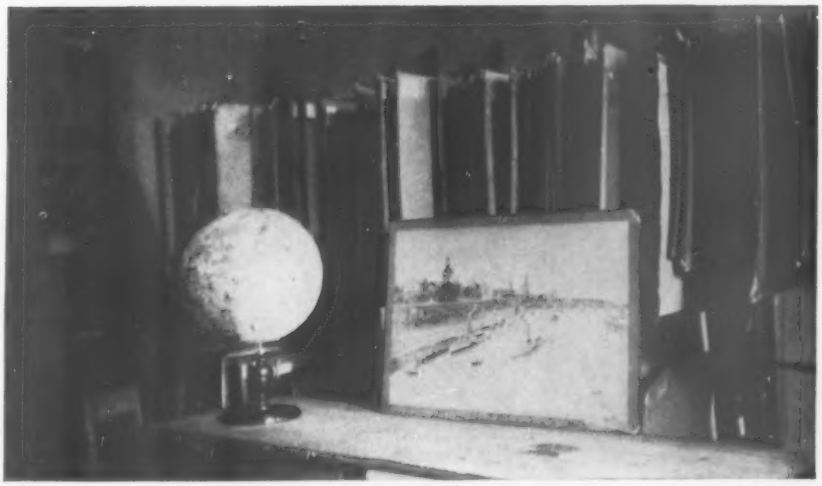
This weather station in the corridor of a Volksschule in Kassel may be utilized by many classes because it is so accessible

THE SCIENCE PAVILION IN GEMEINDE SCHULE, HOHENZOLLERN PLATZ, BERLIN, ILLUSTRATES THE USE OF A HALLWAY FOR THE DISPLAY OF BIOLOGICAL MATERIALS

In the cages are birds, reptiles, insects, mammals and other animals. The children take care of the materials, under the supervision of the instructor. The biology rooms for elementary classes adjoin the corridor

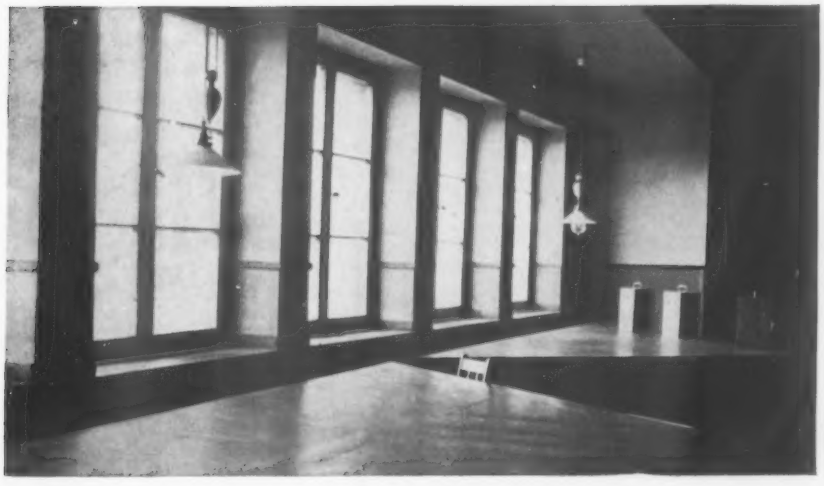
A VIEW OF THE NEW TYPE OF PIPE FURNITURE THAT IS USED IN MANY SCHOOLS OF GERMANY

This is a domestic science (sewing) room in the Wilhelmstrasse Schule, Magdeburg



A SUPPLY ROOM FOR GEOGRAPHICAL MATERIALS IN THE GEORG PLATZ SCHULE, DRESDEN

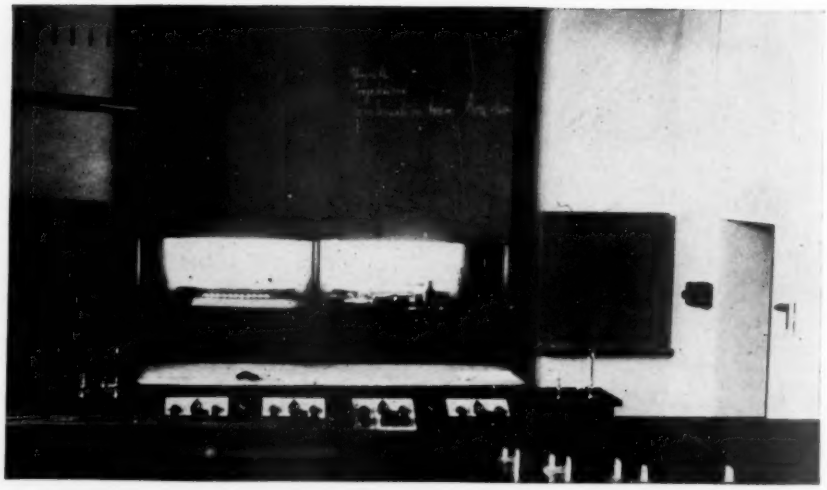
Geographical materials in most elementary schools in Germany are stored and cataloged in a central room, to which all teachers have access. In this school the elementary science department has a similar supply room



BIOLOGICAL TABLES IN THE LESSING OBERREALSCHULE, DÜSSELDORF, DESIGNED TO SECURE THE MAXIMUM AMOUNT OF LIGHT IN MICROSCOPIC WORK

AN INSTRUCTOR'S PREPARATION AND SUPPLY ROOM, ADJOINING THE MAIN BIOLOGICAL LABORATORY IN THE KLOTZSCHE LANDES-SCHULE, DRESDEN

Teachers are commonly provided with a large amount of space for individual research work and preparation for class instruction



THIS UNIQUE DEMONSTRATION ROOM IN THE BERTHOLD OTTO SCHULE REAL GYMNASIUM AFFORDS A GREAT AMOUNT OF SPACE FOR DEMONSTRATION

The service includes electricity, gas and water, provided at a counter on the side and in front of the movable demonstration table. The blackboard is, in reality, an opaque window which can be raised to permit a view of the entire supply room beyond

A CHEMISTRY LABORATORY IN THE OBER-REALSCHULE, DRESDEN

The students work at individual tables, the heights of which are such that experiments may be performed comfortably while seated

The Broad Scope of Industrial Education in the Pasadena Junior High Schools

By GEORGE D. HENCK

Director of Industrial Arts, Pasadena City Schools, Pasadena, Calif.

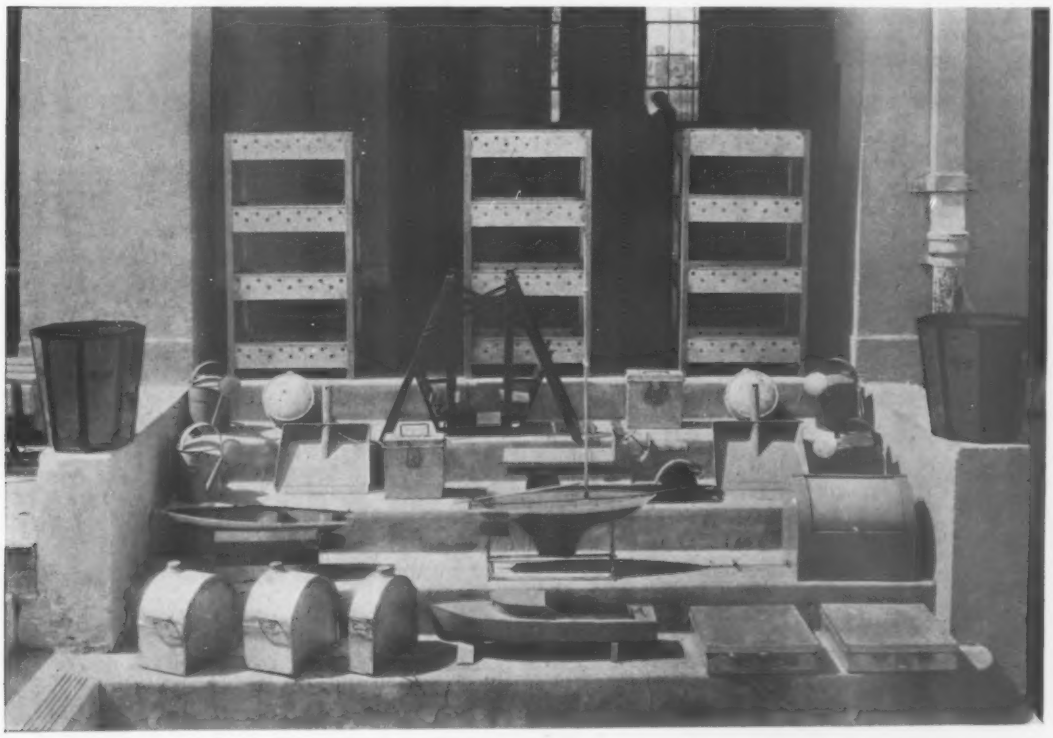
IN Pasadena the schools are organized on the 6-4-4 plan, which provides the richest of opportunities for the industrial education program. Briefly stated, the objectives set up for the department are:

1. Exploration
2. Social habits and attitudes
3. Consumers' knowledges
4. Educational guidance
5. Vocational guidance
6. Avocational interests
7. Appreciation of industrialism

Industrial arts courses are required of all boys entering junior high school at the 7th grade. The requirement is justified, not on the ground of any single objective stated above, but rather on the assumption that as members of society the boys will live in a highly mechanized world, in which more and more of the labors of today will be carried on through man's control of automatic electrical and mechanical devices. The courses must be considered, then, not as specialized vocational work, but rather as a common integrating experience required of our future citizenry.

The First Courses Are Exploratory

In setting up the program we have been mindful of the fact that 98 per cent of all the boys of appropriate age in Pasadena are enrolled in the junior high schools. Our program must be flexible in order that we may care for the varying interests, capacities and abilities of this heterogeneous group. Therefore we begin with required exploratory courses throughout the seventh year, working in the fields of woodworking, printing and mechanical drafting. All these fields of activity are of fundamental importance, in respect to their economic and social value as well as from the point of view of the numbers of adult workers whom they employ. Drafting is of course the universal language of industry, and wherever construction work of any nature is carried on, its use is of fundamental importance.



EXAMPLES OF CREATIVE ACTIVITY IN SHEET METAL WORK IN THE McKINLEY JUNIOR HIGH SCHOOL, PASADENA, CALIF.

THE INDUTRIAL ARTS BUILDING OF THE McKINLEY JUNIOR HIGH SCHOOL, PASADENA

Exploration is further emphasized through visits to plants and factories, through use of the radio, moving pictures and library reference work, and through talks by leaders in industry who are called in to discuss with the classes the many economic and social problems involved in their particular field.

Social Habits and Attitudes Are Cultivated

The work of the eighth grade is elective and involves participation in courses in electricity, metal work (including sheet metal, machine shop and foundry practice), and auto mechanics; again the work is of an exploratory nature. While skill in the manipulation of tools, materials and machines is achieved, it is not the chief aim. Projects are chosen by the students which will fulfill the psychological and sociological needs and interests of boys of this age. The work is so organized as to provide an opportunity for the solution of problems as well as for participation in activities on an individual, small-group and entire-class basis. Accordingly it is possible to provide each individual with a type of experience for which he will find a need.

Many of our most valuable concepts of citizenship, industry, cooperation and leadership are realized through industrial arts programs which are organized to give at least a part of their time to cooperative enterprise. An entire class may organize itself as an industrial unit ostensibly to produce certain items of value to themselves and to the community. This will involve definite planning as to best methods, the proper selection of materials, cost accounting, time schedules, and the like. Through discussion, the relative advantages of individual versus group organization is emphasized. These discussions lay the groundwork for an appreciation of our present-day economic-industrial structure.

Consumers' Knowledges and Skills

The common integrating values of industrial arts work are further strengthened through the "consumers' knowledges and skills" part of the program. This is planned in accordance with our basic philosophy which leads us to believe that as consumers we should all be able to intelligently select, use, and care for the many mechanical and electrical appliances manufactured for the home. At the present time they represent a rather appalling list, and we can derive small comfort from the fact that the number increases almost from day to day.

The industrial arts work of the ninth and tenth grades, like that in the eighth grade, is elective, the difference being that in the two upper years of the junior high school the student, after selecting the course which he is to follow, continues with this course throughout the entire

year. To the values already enumerated for the work of the lower grades we may add the following: educational guidance, vocational guidance, and avocational interests.

Educational and Vocational Guidance

Educational guidance is of extreme importance during these, the beginning years of secondary schooling. For many students, industrial arts courses function negatively in this respect, while for others they are quite positive. Those students for whom industrial arts hold no direct interest or possibility for future personal contacts, may well turn their time and attention to other phases of education. For those who are interested in further possibilities within this field, additional consideration must be given to the many problems involved in an individual's educational program.

Vocational guidance likewise acts both positively and negatively for industrial arts students. For those who continue work into the ninth and tenth grades and find their major interests and capacities lying within the field of industrial arts, a program should be arranged embodying not only manipulative work, but also a comprehensive program of occupational studies. The student should learn about the requirements and opportunities, the advantages and disadvantages, remuneration, etc., of the various types of industrial pursuits in closely related fields. Future possibilities for modification, change or discontinuance of various callings must also be taken into consideration. All the facts are necessary before a student can make an intelligent choice of a vocation.

Education for Leisure Time

As our industrial organizations continue to become more efficient, all of us, irrespective of social status or type of employment, will find ourselves with additional free time. With proper training this leisure time may be made both wholesome and profitable, for adults as well as for boys and girls. Many professional men, for diversion, turn their attention to sports and hobbies of various kinds. The home-shop idea is fast taking first place among hobbies. Industry, recognizing the trend, is aiding the cause through the development of inexpensive but well-built portable machinery.

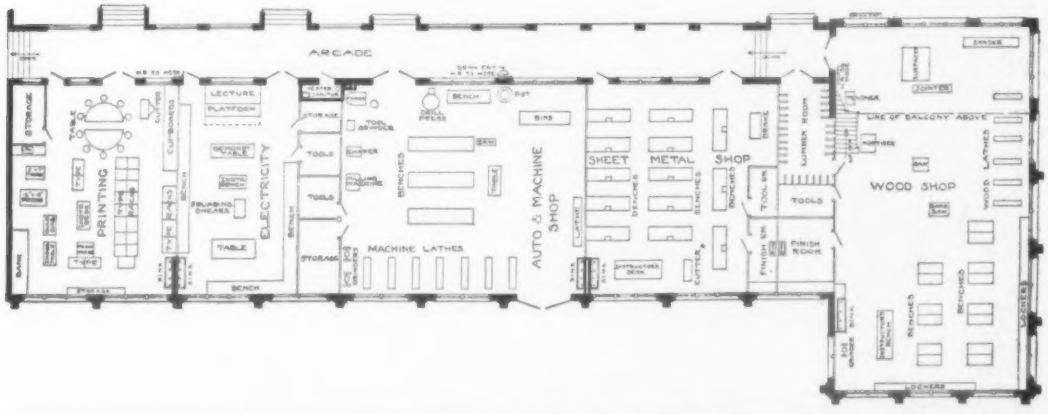
To encourage the wise use of leisure time, the work of the industrial arts department includes the making of such equipment as will form the nucleus for a home shop. The students therefore construct such items as power jig-saws, wood turning-lathes, bench drills, wood-working vises. The rewinding of fractional horsepower motors, together with the construction of electric heaters for soldering irons, and other similar projects, provides a doubly valuable type of work in that a boy obtains part of his fundamental education in the making of these projects. His use of the projects after completion, in his home shop or elsewhere, affords an equally important opportunity for educational growth and training.

Extra-Curricular Activities

Extra-curricular activities as organized in the junior high schools are especially valuable in affording opportunities to industrial arts students for the further cultivation of leisure-time pursuits. The Aero Club at Washington Junior High School, for example, has designed, built and flown a scale model monoplane, powered with a ½-horsepower gasoline engine, which also was designed and constructed by the boys. This year the Club is already at work on a larger plane and motor, which will be completed before the end of the school year.

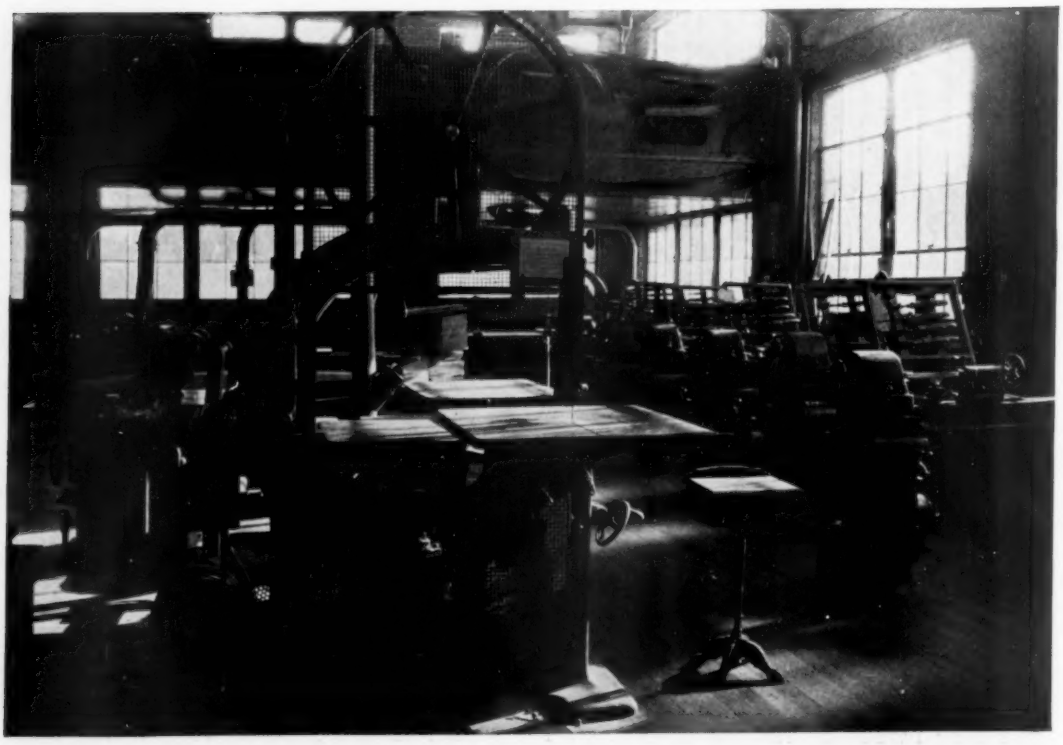
The Selection of Equipment

Much careful thought and consideration must be given to the all-important problem of the selection of equipment for use in the industrial arts work of the junior high school. The equipment should be moderately priced, ruggedly built



THE SHOP LAYOUT OF THE INDUSTRIAL ARTS DEPARTMENT IN THE McKINLEY JUNIOR HIGH SCHOOL

TWO VIEWS OF THE WOOD SHOP IN THE McKINLEY JUNIOR HIGH SCHOOL



THE MACHINE SHOP IN THE McKINLEY JUNIOR HIGH SCHOOL

and modern in design. These general principles are necessary because obsolescence is a serious factor with school plants. Since equipment cannot be scrapped at the end of four or five years, it is extremely important that the most modern types be selected.

With these principles in mind, the equipment in the Pasadena city schools was selected as representing the best current industrial practice. All the woodworking machinery is direct motor drive, which makes for economy of floor space, savings in the care and repair of equipment, less noise and less danger from accidents. The machines are also connected to an exhaust system, thereby improving working conditions for students in the shops as well as adding to the life of the machines.

The Goals Must Be Held In View

The full values of an industrial arts program in the junior high school can be attained only through having in mind at all times the ultimate and immediate goals to be attained. Teachers must be enthusiastic about their work, and in order to maintain their places as leaders must keep in touch with the newer developments in industry. Equipment must be provided which is of such adequate size, accuracy and dependability as to instill a feeling of pride and responsibility in the students because of their ability to control these mechanisms. After all, one of the biggest questions in the world today is, "Shall man or machine dominate?" We trust the proper answer may come through the education and training we are attempting to provide.

PRINCIPAL TYPES OF SHOP EQUIPMENT INSTALLED

Automotive Supplies—J. H. Williams & Co.
Library Equipment—Remington Rand Business Service, Inc.
Machine Lathes—The Monarch Machine Tool Co.
Planes and Tools—Stanley Rule & Level Co.
Presses and Cutter—The Chandler & Price Co.
Printshop Equipment—American Type Founders Co.
Woodworking Machines—Yates-American Machine Co.

Cram and Ferguson, Architects, Boston, Mass.

A New Science Building for a Boys' Preparatory School

The Thompson Science Building, The Phillips Exeter Academy, Exeter, N. H.

By WILHELM SEGERBLOM

Head, Department of Chemistry

THE Departments of Physics and Chemistry at The Phillips Exeter Academy have recently moved into a new building from the two separate buildings which have housed these departments for the past forty years. The new structure is the gift of the late Colonel William B. Thompson, of Yonkers, N. Y., a graduate of the Academy in 1890 and donor of several other buildings.

The Construction of the Building

The Thompson Science Building consists of a central unit, approximately 60 by 75 feet, of three stories and an attic, and two two-story wings, about 36 by 50 feet. A basement extends under the entire building. The exterior is of brick with white trim. The two front entrances face east toward the new quadrangle being developed in the "Yard." An entrance on the south opens directly into the physics lecture room. At the rear is a students' entrance to the basement, and a ramp entrance for the delivery of supplies. Two stair wells extend from the basement to the top floor, with a minimum wastage of floor space.

All floors are of 9-inch square mastic tile. The walls of the laboratories, stock rooms, and stair wells are finished in special chemical-resistant glazed hollow brick of a restful, pleasing color. Special anti-glare electric light fixtures are used throughout. All plumbing and piping is exposed or put in paneled wall compartments for ease in making repairs. The plumbing fixtures in the chemical laboratories are of dull nickel; in the rest of the building they are of chromium plate. Since the building is heated from the school's central heating plant, the two chimneys are dummies; they rise from the attic floor level and serve simply as exits for the ventilation ducts.

The Basement

The first floor is devoted entirely to physics, the second and third to chemistry, while the basement is shared by both departments. The basement contains a large examination room for physics, a coat room, toilets for students, a

THE ELEMENTARY CHEMISTRY ROOM

THE PHYSICS LABORATORY

janitor's room, a room for the student organization called the Scientific Society, a photographic dark room, a stock room for surplus physics apparatus, a similar one for chemistry, and rooms for storage batteries, a motor-generator, ventilation fans, a compressed-air pump, etc. The acid room is equipped with ledges to hold carboys; shelves for bottles; compressed air for emptying carboys; a sink with hot, cold, and distilled water; a flush faucet for emergency use; and a floor drain.

The Physics Department

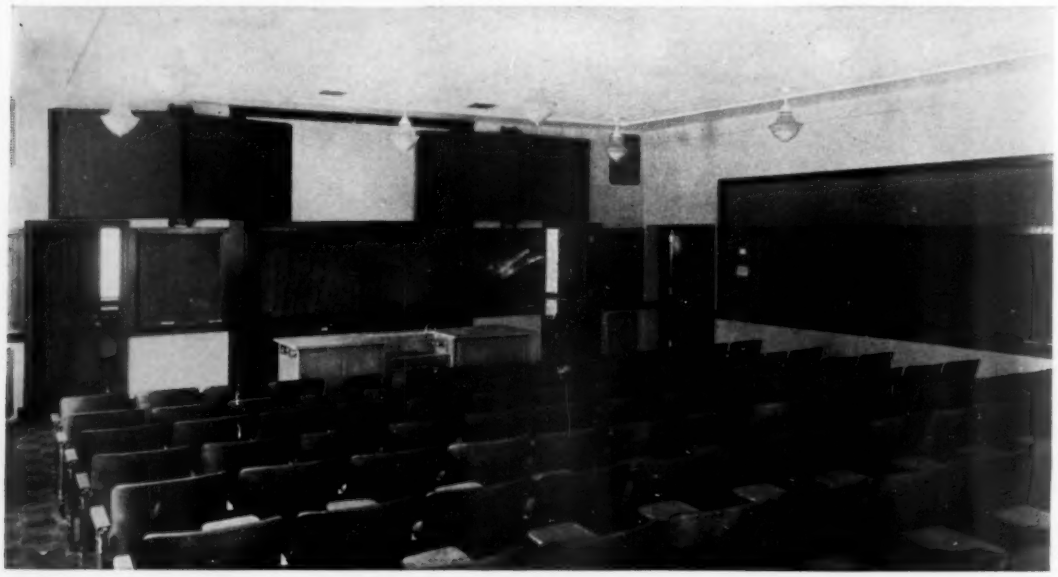
The first floor comprises a large laboratory, a lecture room, a commodious stock room, two small classrooms, a preparation room, shop, coat room, and three offices, one having an adjoining private laboratory for the instructor's use. The physics laboratory is supplied with eight working tables, amply equipped with electric current and other appliances, including sliding blackboards and apparatus cases. The lecture room seats 140 students and has a sloping floor, stationary chairs, a fully-equipped demonstration table, sliding blackboards, screen and lantern equipment, and a ceiling treated for sound deadening. The stock room, generously supplied with apparatus cases, adjustable shelving and a sink, is in the center of the building between the laboratory and the corridor.

Elementary Chemistry Units

Accommodations for 192 students in elementary chemistry and for 20 second-year chemistry students are supplied on the two upper floors. The four elementary chemistry units are distributed two on the second floor and two on the third; they enable four teachers to conduct work at the same time, each independent of the other three. A unit consists of a combination class and laboratory room with a demonstration table, movable tablet arm chairs for twelve students, two rows of laboratory tables, a sliding blackboard, stationary blackboards, and wall shelves. A ceramic wall sink with stone drain board and with hot, cold and distilled water, is for general use. Steam radiators, a unit ventilator and exhaust wall grills take care of heating and ordinary ventilation. In the ceiling above the demonstration table are floodlights for showing up exhibits on the table.

The Laboratory Tables

The laboratory tables have been specially designed and embody several interesting features. They are built in units of eight lockers, four on a side. Three of these units, with large ceramic sinks reaching the full depth of the double unit between them, form a row. The row is supplied with a stone reagent shelf, gas, cold water, and conduits for electric outlets running the full length. Compressed air is piped to one end of the row. The lockers are of wood, with stone tops. The room contains two of these rows, thus accommodating four sections of twelve students each. Each student has four running feet of table top at which to work, but his apparatus is stored in a space below the table top taking not over one running foot of top. This is accomplished by an ingenious arrangement of four drawers covered by a single panel door equipped with combination-master key lock.



THE CHEMISTRY LECTURE ROOM

THE ADVANCED CHEMISTRY ROOM

There are no wall hoods. Each unit has a T-shaped hood equipped with dampers for heavy and for light gases and with hinged windows for protection against spattering. Ducts, one for each hood, carry the fumes straight down through the floor into metallic chemical-proof ducts. These run in channels in the ceiling of the room below to the vertical ceramic flues, whence the gases are carried to the fans in the attic. Wall switches with red pilot lights control the hoods.

The Advanced Chemistry Unit

The unit for second-year chemistry students is in one wing and consists essentially of the same equipment as the elementary unit, except that each student has two lockers, which are larger and have more elaborate shelving for reagents. The table tops in this room are of wood with acid-resistant treatment.

Other Chemistry Department Features

Each of the five chemistry laboratories is equipped with a fire blanket and a recessed shower bath for use in case of accident. Distilled water is distributed to all the laboratories through block tin pipe from a 50-gallon-tank gas-operated still located on the third floor. A storeroom for the distribution of chemical supplies is located in the center of the second floor adjacent to the laboratories and corridors. A similar storeroom supplies the third floor. Elevator service connects all three storerooms with the basement stock rooms

The Chemistry Department is further equipped with a large lecture room similar to the physics lecture room, a preparation room, two balance rooms, and five offices for instruction, one with a private laboratory. Both departments are supplied with wall panels for adjusting the voltage of the electric current furnished to the various students and demonstration tables.

The Exhibition Cases

The walls of the corridors on the second and third floors are lined with 33 exhibition cases for the Academy's well-known chemical collection. The shelves are adjustable and of glass. The doors, each 4 by 6 feet in size, are glazed with an entire sheet of glass. Frosted cylinder bulbs illuminate the interior of the cases.

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

Auditorium Seating and Classroom Furniture—American Seating Co.
Fire Alarms—Holtzer Cabot Electric Co.
Heat Regulating System—Johnson Service Co.
Laboratory Furniture and Equipment—Scientific Equipment Co. and Watson Mfg. Co.
Laboratory Piping—The Duriron Co.
Lighting Globes and Fixtures—Holophane Co.
Partitions, Shower—The Hart & Hutchinson Co.
Partitions, Toilet—Henry Weis Mfg. Co., Inc.
Plumbing Fixtures and Sanitary Equipment—Crane Co.
Valves—Jenkins Bros.

The Function of the Architect's Program

As Applied to the Boys' Trade School, McKeesport, Pa.

By CHARLES L. WOOLDRIDGE

Consulting Engineer, Charles L. Wooldridge, Inc., School Building Consultants, Pittsburgh, Pa.

THE making of the architect's program for the Boys' Trade School in McKeesport, Pa., involved some unusual problems. The purpose of this brief article, however, is not to show in detail just how each of these problems was solved, but rather to give some idea of the difficulties which faced the school board before it retained the services of a qualified consultant, as well as to illustrate the desirability of making a complete architect's program before any architect is employed.

The Problem

The available funds for the building were restricted to $600,000, and this amount had to include the cost of equipment and professional fees. The school had to provide accommodations for 1,080 boys at one time, this number to be divided approximately equally between the academic and the shop facilities. These facilities had to be planned for classes averaging 30 pupils each. It was necessary to locate the building upon a difficult topography at the rear of an existing high school. The lot was so limited in width that great care had to be exercised to conserve the natural light in both buildings. The only feature of the problem which tended to ease its solution was the fact that an auditorium and a cafeteria were not required since the existing high school contained facilities of this nature which could be made common to both buildings.

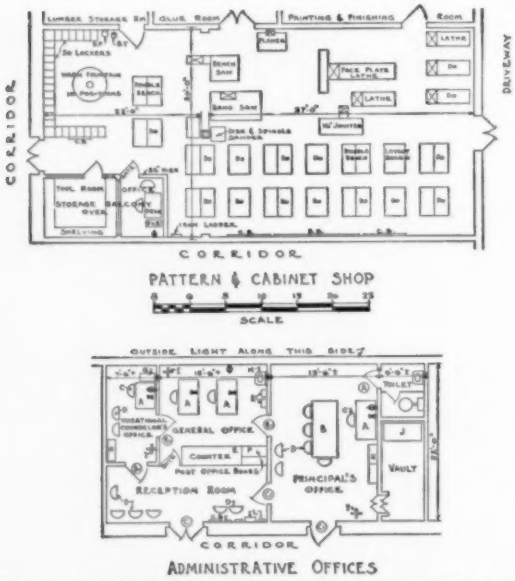


FIG. 1. TYPICAL SKETCHES FROM THE ARCHITECT'S PROGRAM FOR THE BOYS' TRADE SCHOOL, McKEESPORT, PA.

The Architect's Program

The coordination of all these factors into a program for a practical, efficient and economical trade school was very properly allotted to a school building consultant. Such problems do not fall naturally within the scope of either the superintendent's or the architect's training and experience, and, in the interests of economy and good results, should be handed for solution to school-building experts. It was under such circumstances that the writer was employed to make an architect's program, translating into architectural language the exact educational needs of the proposed building. From such a program it was possible for the architect to design a trade school which will fully realize the expressed desires of the superintendent and the school board and yet be consistent with the above-mentioned financial limitations.

The Schedule of Rooms and Requirements

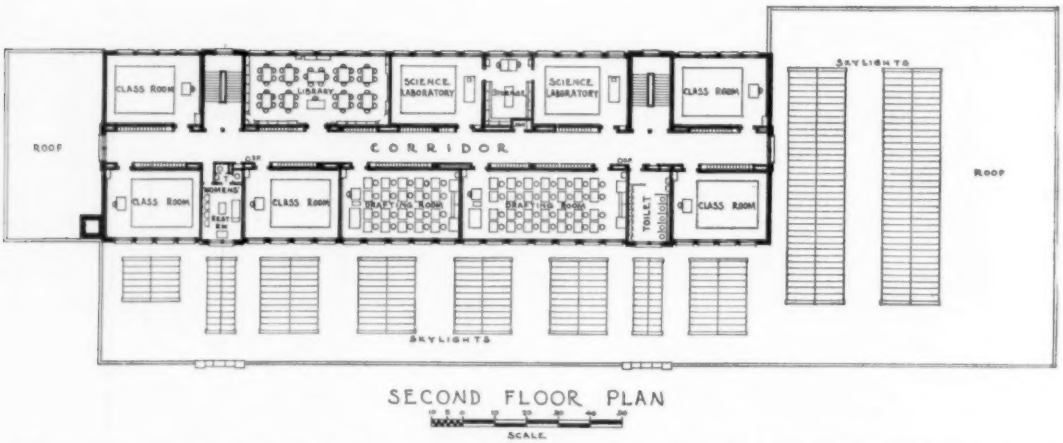
The first step in developing the architect's program was a collaboration with the vocational staff and the superintendent of schools in a study of the trades to be taught. The purpose of the study was to reconcile the number and types of trades to a building of such a cubage as could be erected with the funds available. The result of the study is shown in the accompanying table (Fig. 2), which is a part of the architect's program and serves as the chief key thereto. It comprises a list of every room in the entire structure and condenses much valuable information for the architect.

The function of the school-building consultant in developing this list was (1) to limit the trades and related subjects to a number consistent with the funds available for the building; (2) to assure that nothing was listed which it was impossible to include in such a building because of the peculiarities of the site; and (3) on the basis of expert knowledge, to achieve a logical and sensible balance in the types of trades selected, with particular reference to the special trade needs of the community. Every vocational supervisor has his more or less hidden preference for a certain trade over every other trade, and every school superintendent has his penchant for a particular type of work. While the decision of these men is always respectfully accepted as final, the consultant, on the basis of a broad and spe-

FIG. 2.

SCHEDULE OF ROOMS AND REQUIREMENTS - McKEESPORT BOYS TRADE SCHOOL

Department	No. of Rooms	Description	Location	SIZE Wd. Ft.	SIZE Lg. Ft.	SIZE Sq. Ft.	WINDOWS % Floor	WINDOWS Direction	ELECTRIC SERVICE No. of Outlets	ELECTRIC SERVICE Foot Candles at Desk Plane	ELECTRIC SERVICE Double Base Plugs	Floor	Lineal Feet Black Board	Lineal Feet Cork Board	Lantern Screen Panel	Doors	SPECIAL SERVICE Lavatory=L Sink =S Drinking Fountain=F	SPECIAL SERVICE Water=W Gas =G Elec.=E	Remarks
ADMINISTRATIVE	1	General Office	Adjacent Main Entrance						4		1	Mastic Tile		3		B1,C,C1	L	E	Sketch Attached
	1	Vault	Near General Office						1			Concrete				Special			" "
	1	Principal's Office	Adj. General Office			1000±			2		1	Mastic Tile				B1,C1			" "
	1	Principal's Toilet	Adj. Principal's Office						1			" "				A			" "
	1	Vocational Counselor's Office	Adj. General Office						1		1	" "				B1			" "
	1	Combination Conference & Class Room	1st Fl.Near General Office	22	30				6	6	1	" "	36	3	1	B			" "
	1	Teachers' Room	1st or 2nd Floor			330±			2		1	" "		3		B1			See Text
	1	Teachers' Room Toilet	Adj. Teachers' Room						1			" "				A or B			" "
	1	Book Supply Room	Adj. Janitor's & Receiv.Rm.			600±			As need-ed			Concrete		3		E & B			See Space Study
	1	Shop Supply Room	Adj. Janitor's & Receiv.Rm.			600±						Concrete				A,B & E			" " "
	1	Janitor's & Receiving Room	1st Fl. Entrance at Grade			600±						Concrete				B & Special	L		" " "
	1	Women's Rest Room	Any Floor			250±			2			Terrazzo&M.T.				B1			See Text
ACADEMIC	12	Class Rooms	Any Floor	22	30		20	Unilateral	6	6	1	Mastic Tile	36	3	1	B			Sketch Attached
	1	Class Rom - Large	Any Floor	22	45		20	Unilateral	8	6	1	" "	50	3	1	B			" "
	2	Trade Theory Class Rooms	First Floor	22	30		20	Unilateral	6	6	1	Wood	22	3	1	B			" "
	2	Related Science Laboratories	Any Floor	22	30		20	Unilateral	6	6	1	Mastic Tile	36&40	3	1	B		W,G &E	" "
	1	Related Science Laboratory Storage	Between Science Labs.	22	15		20	Unilateral	2		1	" "				B			" "
	2	Related Drafting Rooms	Any Floor	22	37½		20	Unilateral	8	10	1	" "	28	16	1	B	L		" "
	1	Library	2nd Floor	22	45		20	Unilateral	8	10	1	" "	9	6	1	C	L		" "
SHOPS	2	Trade Drafting Rooms	Any Floor	22	52½		20	Unilateral	10	10	1	" "	32	20	1	B	L		" "
	1	Trade Drafting Room	Any Floor	22	45		20	Unilateral	8	10	1	" "	32	16	1	B	L		" "
	1	Blue Print Room	Adj.Trade Drafting Room			250±			2			Concrete				B	S	E	" "
	1	Pattern & Cabinet Shop	1st Floor	30	60					6	1	Factory	12	15		Text	F	E & G	" "
	1	Carpentry & Mill Work Shop	1st Floor	30	60					6	1	"	12	15		"	F	E & G	" "
	1	Glue Room	Between Above Wood Shops	18±	30							"				"	S	E & G	" "
	1	Painting & Finishing Room	with doors opening	27±	30							"				"		E	" "
	1	Lumber Storage Room	to each shop	18±	30							"				"			" "
	1	Plumbing - Heat. & Ventilating Shop	1st Floor	30	60					6	1	"	20	15		"	S & F	E & G	" "
	1	Telephone & Radio Shop	1st Floor	30	60					6	1	"	24	21		"	S & F	E & G	" "
	1	Electric Wiring Shop	1st Floor			1500±				6	1	"	8	3		"	F	E & G	" "
	1	Power & Equipment Shop	1st Floor			1200±				6	1	"	8	11		"	F	E & G	" "
	1	Auto & Aero Mechanics Shop	1st	30	64½					6	1	Concrete		3		"	S & F	E & G	" "
	1	Auto Electric Shop	Floor																
	1	Auto Service Shop	1st Floor	30	64½					6	1	"		3		"	F	E,W & G	" "
	1	Foundry & General Welding Shop	1st Floor	30	45					6	1	"	10	15		"	F	E & G	" "
	1	Machine Shop	1st Floor	30	67					6	1	Factory	12	9		"	F	E & G	" "
	1	Bldg.Trades Proj.Shop & MasonryTrades Shop	Ground Floor	30	60				As Needed	6		Concrete	12	12		"		E,W & G	" "
	1	" " " " " " Shop Stg.	" "			1000±						"		3		"	S & F		" "
	1	Commercial Art Shop	Ground Floor	22	45				8	10	1	Mastic Tile	12	36		B & A	S & L		" "
	1	" " " Storage & Dark Room	Adj. Commer. Art Shop	22	15						1	" "				A & B	S	E	" "
	1	Merchandising Shop	Ground Floor	22	45				8	6	1	" "	18	15		B			" "
	1	" " Storage	Adj.Merchandising Shop	22	15				2			" "		3		A & B	L		" "
HEALTH	1	Gymnasium	Top Floor	45	80				As Need.	6		Maple				B & A			Space Study
	1	Gymnasium Storage	" "			175±			1			"				A			" "
	1	Boys Gym Locker & Shower Room	" "			1000±			As			Concrete		6		A	F		" "
	1	Boys Suit Basket Storage	" "			350±			Needed			"				Special			" "
	1	Gymnasium Instructor's Office	" "			225±			2		1	Mastic Tile				B1			" "
MISCELLANEOUS	1	Band Instructor's Office	" "			225±			2		1	" "				A & B			" "
	1	Music and Band Suit Storage	" "			175±			2			" "				A			" "
	1	Band Instrument Storage	" "			550±			4			" "				A			" "
	1	Film Storage	" "			50±			1			Concrete				Kalamein			" "
GENERAL		General Lockers	Ground,2nd & 3rd Floors																See Text
		General Toilets	All Floors						2	3		Terrazzo				D			" "
		Corridors	"						As	3		See Text		Text		B	F		" "
		Boiler Room	"						Needed			"							" "
		Fuel Storage	"						"			"							" "



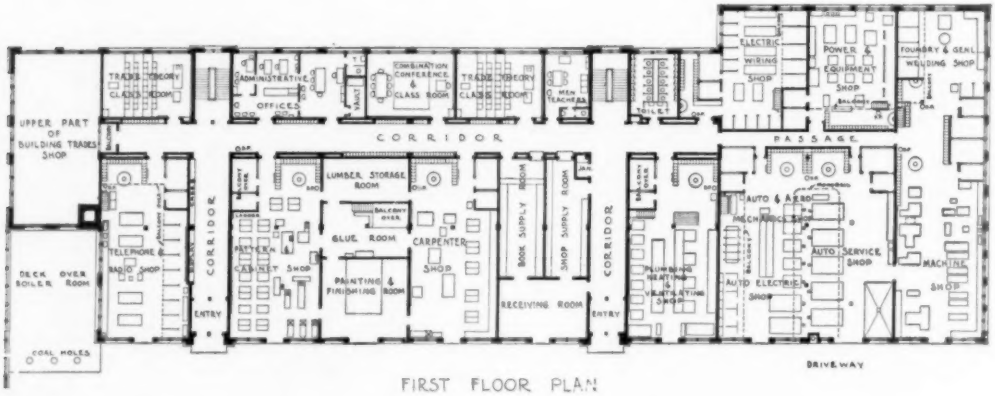
SECOND FLOOR PLAN

SCALE

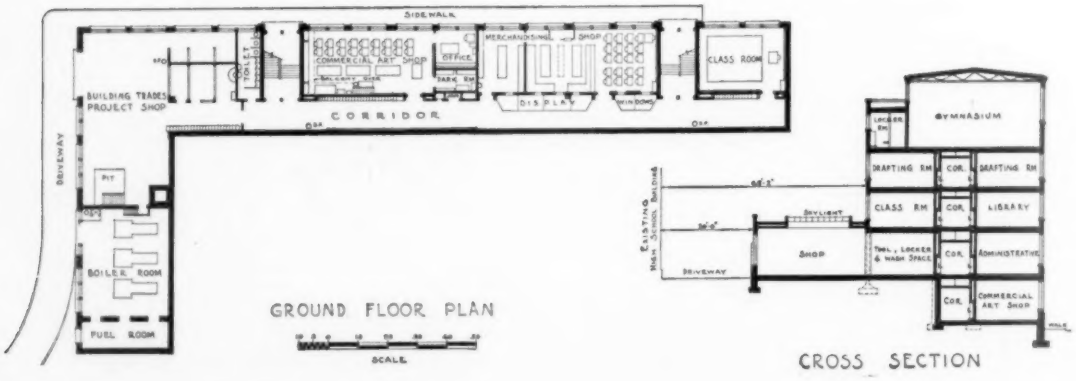
FIG. 3, AND, BELOW, FIGS. 4 AND 5. THE ARCHITECT'S FINAL PRELIMINARY STUDIES OF THE FLOOR PLANS FOR THE BOYS' TRADE SCHOOL, McKEESPORT

cialized experience, can often render invaluable advice productive of much economy by suggesting such limitations as will lead to a more perfect balance in the ultimate school unit.

The Schedule of Rooms and Requirements represents a most important key to the compilation of the entire architect's program and is worth much thorough study and analysis from every conceivable angle. The columns to the right of the list represent *structural, architectural* or *service* features of each room which bear upon its *educational* efficiency. They tell the architect, in a condensed form, just what general features every room must contain to be of the desired educational merit, and they incorporate information which should be known before even the most sketchy preliminary plan is made. Many pages could be written about the importance of first



FIRST FLOOR PLAN



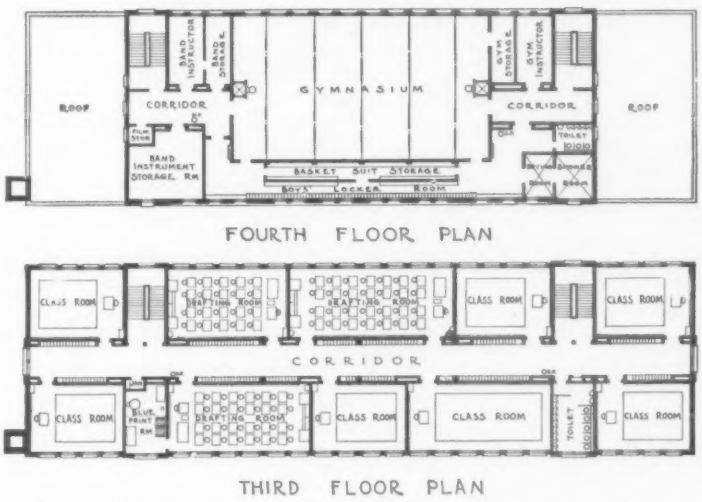
GROUND FLOOR PLAN

SCALE

CROSS SECTION

making all the decisions which this table represents before employing the architect. His function is to mold all these units into a harmonious and efficient building.

In the column under "Remarks," the reader will note that in the case of nearly all the units there is a reference to the "sketch attached." Fig. 1 is typical of two of these attached sketches. The purpose of the sketches was to fully inform the architect what each room or unit must contain when the building is completed. It should be noted that no attempt was made by the school-building consultant to combine these rooms into a complete building. Such work was properly left entirely to the architect, who was accorded every possible freedom in the design of the building. Where, however, several rooms had to be *en suite,* the program contained sketches suggesting an ideal arrangement.



FIGS. 6 AND 7. FLOOR PLANS FOR THE BOYS' TRADE SCHOOL, McKEESPORT

The sketches mentioned above were not given final approval nor incorporated into the program until they were carefully studied by the school administration and revised to the complete satisfaction of the vocational staff.

Space Studies

When the Schedule of Rooms and Requirements (Fig. 2) was developed, and when all the sketches were completed, the consultants next developed space studies. These were used as a means of proving that the requirements set forth in the Schedule and the sketches were feasible, practical and capable of being worked into a proper structure. Such space studies were for the most part fragmentary, and purposely were never developed beyond the phase of mere single line sketches. From the point of view of the architect, they were an aid in suggesting various ways to combine the required units, without being a limiting influence in this respect.

The Architect's Task

With these three fundamental features completed, the program was supplemented with a full explanatory text covering all the features included in the Schedule, sketches and space studies, and such miscellaneous requirements as it was necessary to specify. It was then ready for final approval by the school administration and the school board. After that, it was handed to the architect, with the board's authorization for him to proceed with his preliminary sketches. Figures 3–7 show the architect's final preliminary sketches of the floor plans. They illustrated to the school board and its administration that the trade school will be the embodiment of their definite ideas for such a building, and will represent the most practical and most efficient expenditure of the taxpayers' money.

The New Chemistry Building at Fisk University

By ST. ELMO BRADY

Head, Department of Chemistry

THE new Chemistry Building at Fisk University was built to accommodate 410 students, not including those who use the research laboratories. The building has main entrances on the east and west sides, and is three stories high on one side, two on the other. With a frontage of 154 feet and a depth of 80 feet in the wings, it presents an imposing picture, placed as it is just off the southwest corner of the new library. The exterior walls are of hand-made brick, trimmed with a process stone which blends well with the dark red brick.

The building is fireproof throughout. The corridors and laboratories are of cream-colored glazed brick. The ceilings are of concrete mortar and all pipes are exposed. The minor partitions are of a single thickness of brick so that they may be easily removed at any time when it becomes desirable. Mastic, tile, wood and terrazzo are used for the floors.

Instruction Rooms

There are two classrooms, one on the second and one on the third floor. The main lecture room, which accommodates 160 persons, is so located that it is accessible from both the first (or basement) and the second floor. The acoustic and lighting facilities are excellent. The room can be darkened for moving pictures by curtains which are operated electrically by means of a switch at the lecture table. There is a specially powerful down-draft hood on the demonstration table. To the rear of the room is a preparation room where the experiments and demonstrations for lectures are prepared. A laboratory for physical chemistry and electro-chemistry is at the north end of the first floor. The laboratories for elementary chemistry, inorganic chemistry and qualitative analysis occupy the second floor, which is accessible from the campus. These laboratories are provided with work desks so arranged that several sections can meet at one time. Courses in analytical chemistry are allocated to the third floor, the south end; the north end is given over to organic chemistry.

Offices and Research Quarters

Distributed throughout the building are suites for the professors. Each comprises an office and a private laboratory. The research laboratories for students are adjacent to the professors' suites, so that the professors may keep in close touch with the students at all times. One research laboratory on the second floor, known as the Visitors' Laboratory, has been set aside for use by visiting professors who desire to spend some time doing research work.

The general office, the office of the head of the department, and the latter's research laboratory are on the main (second) floor near the entrance. The departmental library occupies a large room on the third floor and has a capacity of 3,000 volumes. Adjacent to it is a seminar room. Also on the third floor is a well-equipped first-aid room, done in white tile.

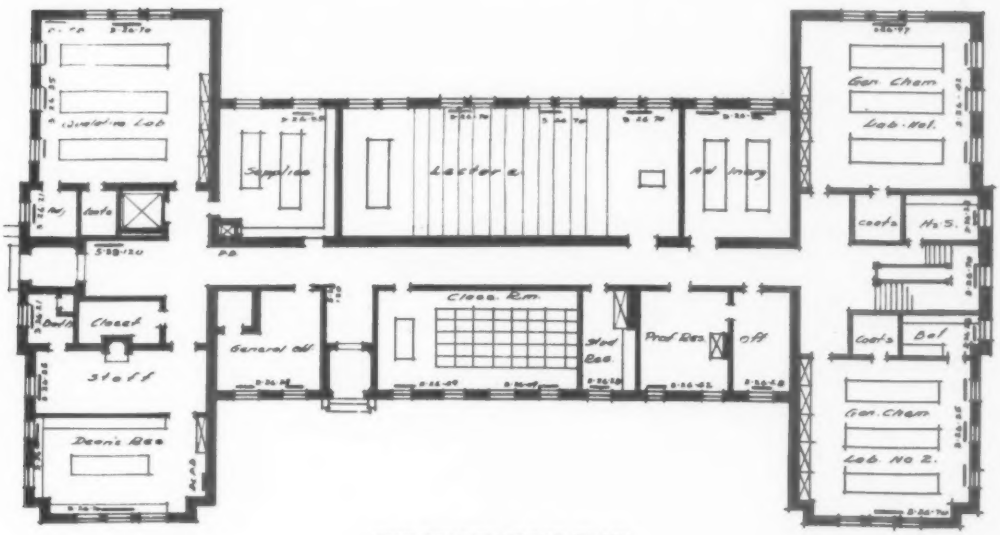
Storage Rooms on the First Floor

The supply rooms for the storage and disbursement of chemicals and apparatus have been so placed as to give the most prompt and efficient service. The receiving room is on the first floor. Transportation of supplies to the various supply rooms is facilitated by an automatic dumb-waiter and an automatic elevator.

The glass storage room, in the south wing of the first floor, has bins with wire bottoms for

Henry C. Hibbs, Architect, Nashville, Tenn.

THE FISK CHEMISTRY BUILDING NEARING COMPLETION



THE SECOND FLOOR PLAN

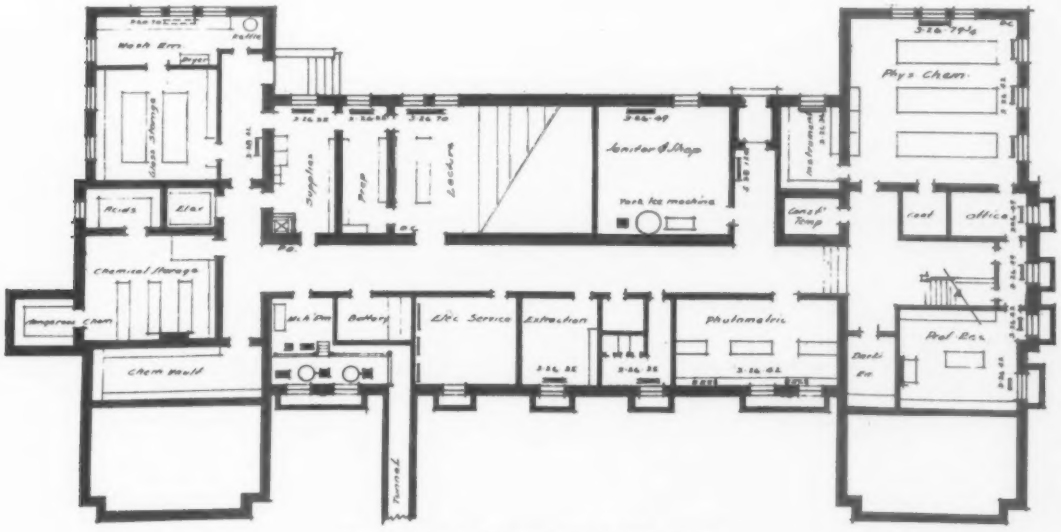
holding glassware of various sizes. Storage space is provided for corks, and there are chests of drawers of various sizes for articles like thermometers, drying tubes, etc.

The chemical room is in the same wing, but separate. Opening off it on one side is an acid room, equipped with stone shelves. Here acids are unpacked and the bottles are stored. Opening off the south side of the chemical room, and extending underground away from the building, is a cement room for the storage of dangerous chemicals. It has a man-hole and is separated from the building by double fire-doors, thus offering absolute safety to the building so far as explosions are concerned.

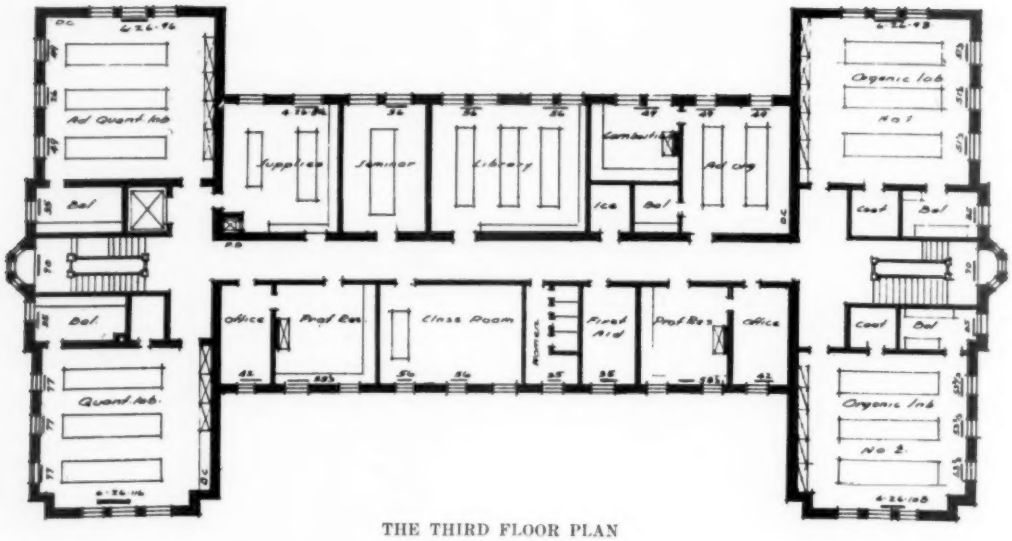
A special cold room on the first floor has been provided for work with materials which are unstable at ordinary temperatures and for which low temperatures must be maintained. A temperature of 28 degrees F. can be maintained automatically within a degree or two.

Service Systems

Five special service systems are provided, in addition to the pipes for the steam supplies, the steam returns, and the many steel conduits for the systems of electric wiring. The services furnished are gas, steam, compressed air, distilled water and hot water. The storage tank for dis-



THE FIRST OR BASEMENT FLOOR PLAN



THE THIRD FLOOR PLAN

tilled water holds 150 gallons; the outlets are in the center of each corridor.

A special room on the second floor is provided for hydrogen and sulphide gas. This reagent is supplied by a gas meter which is automatically replenished from a cylinder. It is distributed to a series of small pipes, each provided with an outlet of hard rubber located under a specially constructed hood.

Desks and Hoods

All desks and tables in the building are furnished with stone tops, and with the exception of the physical chemistry tables, the desks have a central trough and an end sink. The hoods in the laboratories throughout are of the open-face, baffle-plate type, and each hood or bank of hoods has its own motor and fan with a control on the side of the hood. The two fan rooms are at the top of the building, one at each end.

The Chemistry Building, which was opened in September, 1931, was constructed at a total cost of $176,803, a cubic-foot cost of 42 cents.

PRINCIPAL TYPES OF EQUIPMENT INSTALLED

Acid-Resisting Pipe—The Duriron Co.
Blackboards—Natural Slate Blackboard Co.
Classroom Furniture—The Irwin Seating Co.
Clocks and Signal Systems—International Time Recording Co.
Doors—Roddis Lumber & Veneer Co.
Heating System—C. A. Dunham Co.
Laboratory Furniture and Equipment—Kewaunee Mfg. Co.
Library Equipment—Art Metal Construction Co.
Lighting Globes and Fixtures—Edwin F. Guth Co.
Plumbing Fixtures and Sanitary Equipment—Standard Sanitary Mfg. Co.
Valves—Sloan Valve Co.
Ventilating System—Ilg Electric Ventilating Co.
Window Shades—Hixon Electric Co.
Wrought Iron Pipe—A. M. Byers Co.

EASTMAN KODAK COMPANY

Chemical Sales Department

Rochester, New York

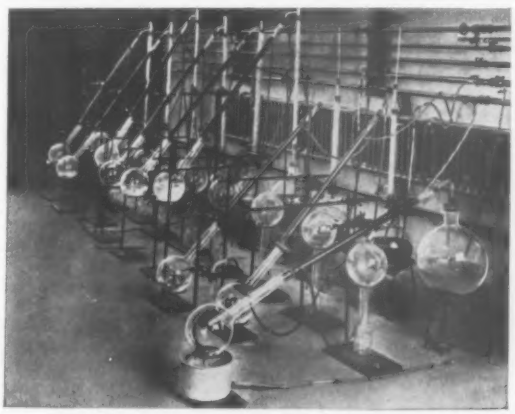
A CHEMICAL INDUSTRY ON A LABORATORY SCALE

The production of Eastman Organic Chemicals began in the early part of 1918 in a special department of the Kodak Research Laboratories. Our object was to assure the complete independence of this country with regard to these essential scientific materials. The first list of Eastman chemicals published in 1919 contained about 150 items, but through the constant addition of new products the number now totals over 2700. More than two-thirds of these are manufactured at Kodak Park on a laboratory scale.

The operation of the special department in which they are made is unique, in that the usual chemical plant processes are carried out with laboratory apparatus. The flasks, distilling columns, and evaporating dishes are large-size replicas of the equipment found in the usual laboratory stockroom. The flexibility of this equipment in the hands of capable chemists makes possible the assembly of just the right apparatus, in the most convenient size for each of the various operations.

Every set-up can be taken down readily and re-assembled when needed, perhaps for an entirely different purpose. By working with apparatus applicable to many processes, the capital expenditure is kept low, permitting the economical preparation of many chemicals which are required only in small quantities. The use of glass and ceramic-ware exclusively assures the maintenance of the high degree of purity for which Eastman Organic Chemicals are justly and widely noted.

The Eastman Organic Chemical Price List is recognized as "America's Handbook of Organic Chemicals." Write for a free copy of List No. 23 which contains the names, specifications, and prices of our complete stock of organic chemicals.



A ROW OF DISTILLING COLUMNS USED IN THE PREPARATION OF EASTMAN ORGANIC CHEMICALS

MAURICE A. KNIGHT

KNIGHT-WARE Acid-Proof Chemical Stoneware

227 Kelly Avenue, Akron, Ohio

New York City
804 World Building
Beekman 3–1657

Chicago
230 N. Canal Street
Franklin 4658

San Francisco
Merchants Exchange Building
Douglas 375

KNIGHT-WARE — GUARANTEED SATISFACTORY — MAURICE A. KNIGHT — ACID-PROOF CHEMICAL STONEWARE — "IT IS THE BODY ITSELF"

Detroit
314 Stephenson Building
Madison 9243

Montreal, Que.
1307 Notre Dame Street, West
Main 2625

Philadelphia
1600 Arch Street
Rittenhouse 6300-6301

St. Louis Office
1st National Life Bldg.
Main 1784

Niagara Falls
309 United Office Building
Niagara Falls 507

PRODUCTS

- **Acid-Proof Pipe and Fittings for Laboratory Waste Lines**
- **Acid-Proof Pipe and Fittings for Laboratory Ventilating Lines**
- **Acid-Proof One-piece Laboratory Sinks**
- **Acid-Proof Ventilating Roof Caps**
- **Acid-Proof Sumps or Dilution Basins**
- **Acid-Proof Jars, Tanks, Filters, Funnels, Gas Generators, etc.**

KNIGHT-WARE is a tough, homogeneous and thoroughly vitrified clay product which is GUARANTEED to withstand the action of acids, alkalies, chemicals and all corrosive solutions, weak or strong, hot or cold. Further we GUARANTEE KNIGHT-WARE to be free from defects and satisfactory in EVERY respect.

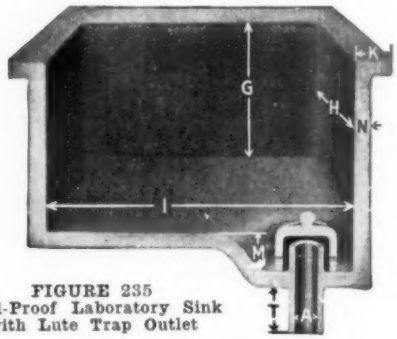


FIGURE 235
Acid-Proof Laboratory Sink with Lute Trap Outlet

KNIGHT-WARE Laboratory Sinks

Our Sinks are made entirely in **one piece** and are entirely **without** seams or joints. All inside surfaces are **smooth** and well **glazed** and corners are all well rounded, making them easy to clean and keep clean. Outlets are generally made **integral** with the body of the sink so that the cost of tail-pieces as well as a joint is eliminated.

KNIGHT-WARE Sinks are made entirely by hand and are not **cast** or made in moulds. This enables us to make sinks to your exact order in any dimensions wanted. Sinks can be had with or without backs or drainboards and with a type of outlet best suited for your needs.

KNIGHT-WARE Sinks will not *flake, peel, pit or slough-off*

The tough, dense body of our sinks will never be affected in any way by any acids (hydrofluoric alone excepted), alkalies or corrosives used in the laboratory.

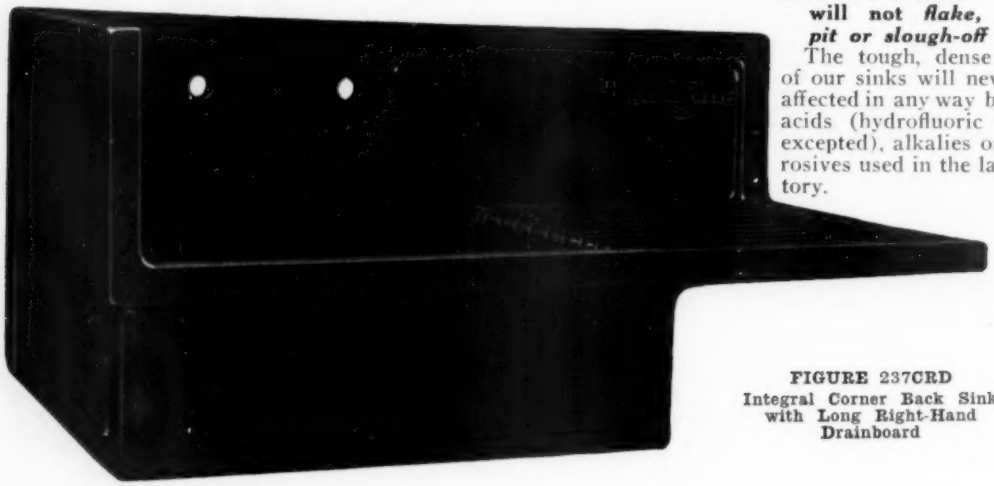


FIGURE 237CRD
Integral Corner Back Sink with Long Right-Hand Drainboard

KNIGHT-WARE Pipe and Fittings

Available in all bores from 1 inch up to and including 60 inches. We can supply any standard type fitting that can be had in any other material and are often called upon to supply special fittings.

KNIGHT-WARE Pipe and Fittings are easily and economically installed. They are hung much the same as any other pipe, one hanger only being required per fitting or length of pipe. The bells on our pipe are deep and well corrugated and our method of joint packing assures you of a perfectly acid and leak-proof joint.

KNIGHT-WARE Ventilating Caps, Sumps, Etc.

These are made entirely to prints and specifications. We are in a position to offer you a variety of designs such as have been supplied for other KNIGHT-WARE installations.

Service

We offer you knowledge and practical experience gained through scores of KNIGHT-WARE installations. This service is yours for the asking and without obligation.

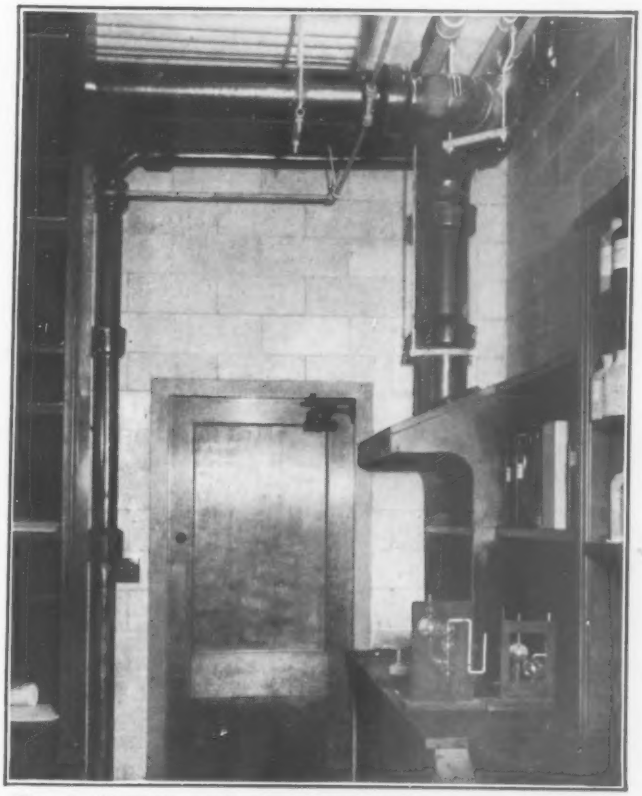
FIGURE 276
B. & S. Reducer

FIGURE 273-A
B. & S. T-Y Fitting

Send for our 48-page fully illustrated Laboratory Equipment Catalog

A few more notable installations of KNIGHT-WARE Equipment:

PRINCETON UNIVERSITY
Chemistry Building
COLUMBIA UNIVERSITY
Chemistry Building
WEST VIRGINIA UNIVERSITY
Hall of Chemistry
OHIO STATE UNIVERSITY
Chemistry Building
Pharmacy Building
JOHNS HOPKINS UNIVERSITY
Chemistry Building
Hygiene Building
Biology Building
NEW YORK UNIVERSITY
Chemistry Building
WASHINGTON UNIVERSITY
Biology Building
DUKE UNIVERSITY
Chemistry Building
PURDUE UNIVERSITY
Chemistry Building
Pharmacy Building
PENN STATE COLLEGE
Chemistry Building
LAFAYETTE COLLEGE
Mining Engineering Hall
BATTELLE MEMORIAL
Chemistry Laboratory
McGILL UNIVERSITY
Pulp & Paper Research Bldg.
COLUMBIA PRESBYTERIAN
Hospital Centre
UNIVERSITY OF CALIFORNIA
Riverside Chemistry Building
NEW YORK-CORNELL
HOSPITAL
Medical Centre



View in Chemistry Laboratory—Princeton University. All Waste, Drain and Ventilating Lines, Acid Dilution Basins, etc., at Princeton are of KNIGHT-WARE

THE MATHESON CO.

East Rutherford, N. J.

HYDROGEN SULFIDE

In Steel Cylinders

For Universities, Colleges and High Schools

Our Gasometers for HYDROGEN SULFIDE are installed in more than two hundred educational laboratories, because they have proved to be the most efficient, convenient, clean, economical and time-saving form of supply.

This modern form of H_2S supply is furnished in five sizes of containers—from 50 pounds content to three-quarters of a pound.

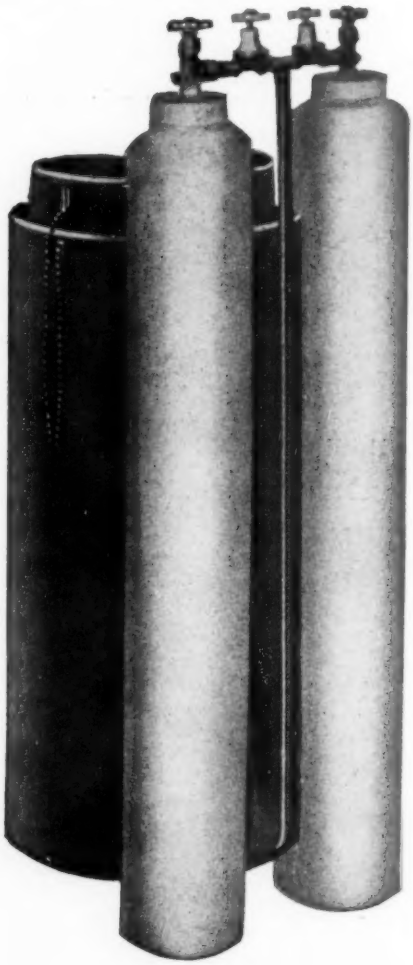
We furnish all forms of control and distribution equipment, complete for class or individual use.

We also supply 28 Compressed Gases with controls and distributors for each kind.

Write for further information

At Left—
NO. 2 CYLINDER
WITH
SHADOWGRAPH
OF
NO. 2 GASOMETER

At Right—
TWO NO. 1
CYLINDERS
WITH
NO. 1 GASOMETER



COMPRESSED GASES

Ammonia (Anhy.)
Argon
Butane
Butylene

Carbon Dioxide
Chlorine
Dimethyl Ether
Ethane
Ethyl Chloride
Ethylene

Helium
Hydrogen
Hydrogen Sulfide
Isobutane

Methane
Methyl Chloride
Neon
Nickel Carbonyl

Nitrogen
Nitrous Oxide
Oxygen
Phosgene
Propane
Propylene

Picket's Fluid
Resusiten
Sulfur
Dioxide (Anhy.)

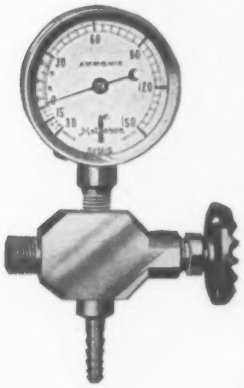
THE LECTURE BOTTLE

On account of the convenience of this Lecture Bottle, it has become standard laboratory equipment in many universities, colleges and high schools. It does not need a regulator—its valve being delicate enough to permit close adjustment without one. It is interchangeable in twenty-four gases, and always in stock for shipment on the day your order is received.

Ask for Bulletin III

AMMONIA REGULATOR

(Non-Automatic)

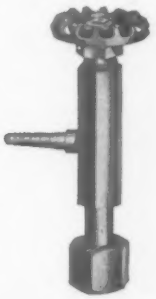


The Matheson Company Ammonia Regulator permits quick and easy adjustment of flow to less than one bubble per second up to full flow.

Ask for Bulletin IV

NEEDLE VALVE

(Non-Automatic)



This Needle Valve is furnished for use where a Gasometer is not desirable. It permits quick and easy regulation of all kinds of gases.

THE OHIO CHEMICAL & MFG. CO.

1177 Marquette St., N. E., Cleveland, Ohio

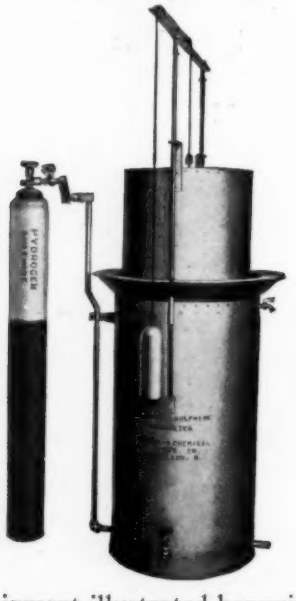
BRANCHES IN ALL PRINCIPAL CITIES

"Save Time in Research"

AN IMPROVED GASOMETER

For Safe and Economic Handling of Hydrogen Sulphide

The "Ohio" Gasometer is designed to insure proper handling of Hydrogen Sulphide in the school laboratory. This gas is very toxic and demands the safest, strongest, and most efficient equipment.



The equipment illustrated herewith minimizes the disadvantages experienced with former types. It is equipped with easy working valves which are as nearly leak-proof as possible to manufacture. The flanged rim of the outside shell prevents the sealing fluid from splashing over the edge. The outlet nipples are placed to prevent the sealing fluid from getting into the lines. A swivel connection provides for variation in cylinder heights, in place of the customary copper tubing which is so easily corroded.

The "Ohio" Gasometer is available in sizes of four and two cubic feet. The larger size is sufficient for a class of one hundred students and the smaller size for fifty students.

CARBON DIOXID SNOW-MAKING OUTFIT

This apparatus is designed to easily and economically convert Carbon Dioxide into snow to be used for class demonstration or as a refrigerant. It consists of a cylinder of Carbon Dioxide, a three-legged cylinder stand, yoke, and a chamois bag with clamp. The cylinder stand ordinarily provided with the outfit is for small-sized cylinders; however, a wall clamp for large-sized cylinders may be had with this outfit.

The chamois bag is also available in two sizes: The smaller size is for use with small cylinders and has a capacity of fifty grams. The larger bag holds one and one-half pounds of CO_2 snow.

Rare and Common Gases for Laboratory Use

We are prepared to supply the following gases in high-pressure cylinders of a size convenient and practical for laboratory experimental purposes:

Ammonia, Anhy.	Isobutane
Argon	Krypton
Butane	Methane
Butylene	Methyl Chloride
Carbon Dioxid	Neon
CO_2-Oxygen Mixtures	Nitrogen
Chlorine	Nitrous Oxid
Compressed Air	Oxygen
Cyclopropane	Phosgene
Ethane	Propane
Ethyl Chloride	Propylene
Ethylene	Sulphur Dioxide Anhy.
Helium	Xenon
Hydrogen	
Hydrogen Sulphide	

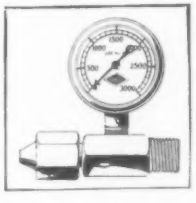
Many new and interesting experiments may be performed in the laboratory by the addition of a few of these gases and equipment for their manipulation. The necessary equipment is very inexpensive. (Shown on next page.)

UNIT PARTS

For Safe and Economic Handling of High-Pressure Gases from Cylinders, in Research and Demonstration

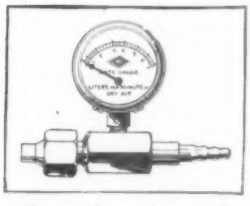
Following the designs and specifications suggested by Professor H. S. Booth, Morley Chemical Laboratory, Western Reserve University, our chemical engineers have carefully produced a set of unit parts which may be used on either large or small type gas cylinders to great advantage.

HIGH-PRESSURE GAUGE



This high-pressure gauge may be inserted in any combination of unit parts, next to the cylinder, to register the cylinder pressure of the gas. In ordering, specify the kind of gas on which the gauge is to be used. Gauges for Oxygen are supplied in polished brass; those for other gases are nickel-plated. Equipment which has been used with any other gas must not be used with Oxygen because of the danger of oil from the other gas getting into the gauge, and then causing a serious explosion when the unit is used for Oxygen. The difference in finish enables you to differentiate Oxygen units from those for other gases.

RATE GAUGE

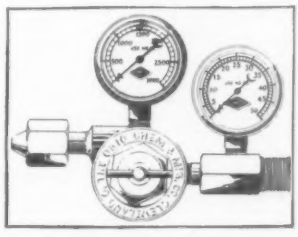


The rate gauge included in the "Ohio" Unit Parts is intended to measure the flow of gas in terms of liters per minute. It is so designed to be usable only with the reducing regulator shown above. This instrument, as well as the other unit parts shown herewith, is being used successfully with dry, corrosive gases and is, to the best of our knowledge, the most satisfactory equipment available for this purpose.

GASES FOR ANESTHESIA

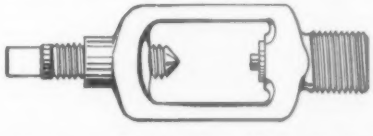
"Ohio" Oxygen, Nitrous Oxid, and Ethylene are recognized by leading surgeons and anesthetists everywhere, as the best gases obtainable for anesthesia. These gases are produced by the most modern and efficient methods, and throughout the process of manufacture are constantly guarded by graduate chemists to maintain their purity and potency. The gases are shipped in cylinders (size B to G, inclusive), which have been thoroughly cleansed and sterilized before being put into service. These cylinders are attractively finished to harmonize with other equipment in the operating room. Medical colleges will find these gases pure and dependable—absolutely safe for student training.

REDUCING REGULATOR WITH HIGH AND LOW-PRESSURE GAUGE



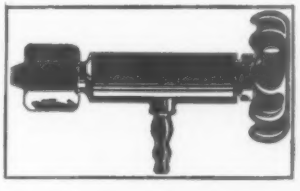
This reducing regulator is equipped with both a high-pressure and a low-pressure gauge. The high-pressure gauge shows the pressure of gas within the cylinder; the low-pressure gauge shows the working pressure, and can be supplied to register a maximum of either fifty or one hundred pounds. It can be fitted with either the nipple hose connection, rate gauge, or needle valve with hose connection. The utilization of cone joints insures gas-tight connections and eliminates the necessity of washers.

THREADED CYLINDER YOKE



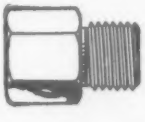
For use on small cylinders (sizes B, C, D, and E) when other parts of this apparatus are to be employed in conjunction with it. Can be threaded to specification for use with any apparatus.

NEEDLE VALVE WITH HOSE CONNECTION



This valve is especially designed for reducing high pressures to permit delicate control of gas flow. It may be attached to the cylinder either by means of the Threaded Cylinder Yoke, or in the case of large size cylinders, by means of the Cylinder Adaptor. This unit also fits directly to either the high-pressure gauge or the reducing regulator, shown on this page.

LARGE CYLINDER ADAPTOR



Large cylinders have a valve with a threaded nipple and require this adaptor or a three-piece adaptor (depending on the kind of gas) to provide a connection for the other apparatus. In ordering, specify the kind of gas and the manufacture, also the maker of the apparatus to be used.

E. H. SHELDON & COMPANY

Muskegon, Michigan

Manufacturers of

LABORATORY, HOME ARTS *and* VOCATIONAL SCHOOL FURNITURE

SHELDON LABORATORY FURNITURE

At the right is a picture of one of the many designs of Sheldon laboratory furniture. In our new catalog will be found many designs developed to meet school needs with the greatest completeness and the utmost economy.

Write for our catalog, and inquire for the services of the Sheldon sales engineers.

NO. 1000

ADJUSTO-POSTURE CHAIR-TABLE

A complete line of Adjusto-Posture Chair-Tables for Class Room, Reading Room, and Study Hall use is illustrated in our new catalog. These Chair-Tables have many features of adjustability, utility, and conveniences not found elsewhere.

Write for our catalog, and inquire for the services of the Sheldon sales engineers.

NO. 85050

A NEW CATALOG OF SHELDON FURNITURE

Our new 352-page catalog contains 621 illustrated designs of Laboratory, Home Arts, Shop, Drawing, and Educational furniture of widely accepted design, and proven merit. Every detail is produced in one fully equipped modern factory, by an organization with a background of over 33 years' experience in this field. Forty-eight experienced sales engineers are located in the principal cities throughout the United States and Canada ready to give you the advantages and economy of Sheldon engineering service in planning and selecting furniture.

Write for this catalog, and ask for the services of our engineers.

NO. 80160

SHELDON COMBINATION TYPEWRITING AND BOOKKEEPING DESK

This table designed to meet the requirements of a standard class room offers the greatest utility, convenience, and economy for the school Commercial Department. The desk automatically encloses the typewriter in a dustproof compartment, decreases maintenance cost of the typewriter, and makes available working space for bookkeeping and other subjects. The cost of this desk is so low that it is automatically paid for many times over by the economies which it effects.

NO. 50050

SHELDON DRAWING TABLE

The new Sheldon catalog illustrates more than fifty designs of Art and Mechanical Drawing tables, most of them new types designed to increase the utility and broaden the scope of Art and Drawing Departments.

NO. 7241

SHELDON HOME-ARTS TABLE

The table illustrated on the left is unsurpassed in convenience of arrangement, capacity of working surface and storage, ease in cleaning, strength, durability and appearance. More than sixty designs of tables and fixtures for the Home Arts Department are shown in the new Sheldon catalog.

Write for the new Sheldon catalog of school furniture.

THE U. S. STONEWARE CO.

Works (Since 1865):—Akron, Ohio
New York Office: 50 Church Street

Acid-proof Chemical Stoneware Laboratory Sinks (One-Piece)

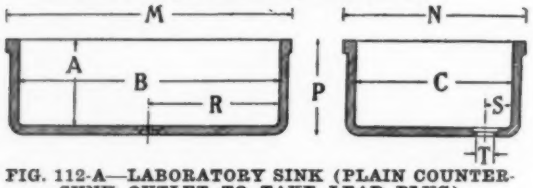


FIG. 112-A—LABORATORY SINK (PLAIN COUNTERSUNK OUTLET TO TAKE LEAD PLUG)

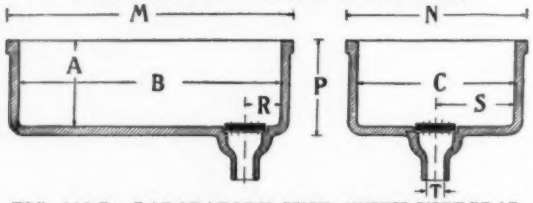


FIG. 112-B—LABORATORY SINK (WITH INTEGRAL NIPPLE AND REMOVABLE STRAINER)

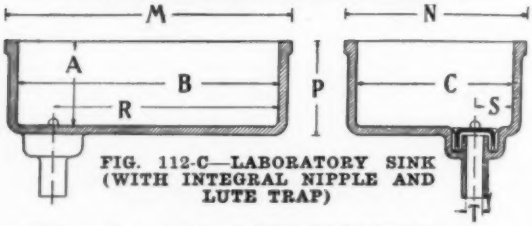


FIG. 112-C—LABORATORY SINK (WITH INTEGRAL NIPPLE AND LUTE TRAP)

Glaze—Our standard "HY-GLOSS" high luster salt glaze is dark brown in color, and is an integral part of the body itself. This glaze is exclusive with us.

Guarantee—"U. S. Standard" acid-proof chemical stoneware is unqualifiedly guaranteed to be acid, alkali and corrosion-proof throughout the entire stoneware body—with or without the salt glaze.

Acid-proof Piping for Acid Waste and Ventilating Lines

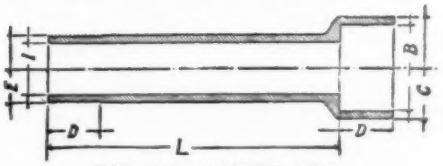


FIG. 149—SOCKET PIPE

Our Acid-proof Chemical Stoneware Piping is the ideal material for Acid Waste and Ventilating Lines. There is no other commercial product which is as universally resistant to acids, alkalies and corrosive chemicals and gases.

Bromine, ferric chloride, sulphuric, sulphurous, nitric and hydrochloric acids of any concentration or temperature, can all be handled with perfect safety. "U. S. STANDARD" Chemical Stoneware Piping is free from all the limitations of brass, rubber, cast iron, lead and high silicon irons. There are no hazards, no leaks and no repairs.

Standard pipe lengths are 60 inches. The hubs are 4 inches deep and both the spigot and hub ends are deeply corrugated. Joints are economically made and easily poured with our "CALK-TITE" Acid-proof Caulking Compound. **The first cost of "U. S. STANDARD" Chemical Stoneware Piping is decidedly lower than for metallic substitutes.**

Our line is complete, including Elbows, Bends, Y's, TY's, Traps, Crosses, Sumps, Floor Drains, etc.

Write for BULLETIN NO. 515 describing our entire Laboratory Line.

LIST PRICES ON ACID-PROOF SINKS (F. O. B. AKRON, OHIO)

Size No.	B	C	A	M	N	P	Code Word	Fig. 112-A Plain Code—ZEST	Fig. 112-A With Integral Backs	Fig. 112-B Plain Code—ZONE	Fig. 112-B With Integral Backs	Fig. 112-C Plain Code—ZURO	Fig. 112-C With Integral Backs
700	11	9	8	14	12	9	TAB	$14.00	.....	.....	.....	.....	.....
701	14	10	6	17	13	7	TACIT ...	14.00	.....	.....	.....	.....	.....
702	16	8	6	19	11	7	TACK ...	15.00	.....	.....	.....	.....	.....
703	15	14	6	18	17	7	TAFFY ..	17.00	.....	.....	.....	.....	.....
704	16	12	6	19	15	7	TAG	17.00	.....	.....	.....	.....	.....
705	16	16	9	19	19	10	TALE ...	24.50	.....	.....	.....	.....	.....
706	18	10	11	21	13	12	TALON ..	23.00	$27.00	$28.00	$32.00	$30.00	$34.00
707	18	14	7	21	17	8	TAMP ...	23.00	27.00	28.00	32.00	30.00	34.00
708	18	14	10½	21	17	11½	TANG ...	29.00	33.00	34.00	38.00	36.00	40.00
709	18	16	6	21	19	7	TAPE ...	24.00	28.00	29.00	33.00	31.00	35.00
710	20	12	7	23	15	8	TALLY ..	21.00	25.00	26.00	30.00	28.00	32.00
711	20	12	12	23	15	13	TAR	28.00	32.00	33.75	37.75	35.75	39.75
712	20	16	7	23½	19½	8¼	TAUNT ..	22.00	26.25	27.75	32.00	29.75	34.00
713	24	15	8	27½	18½	9¼	TENOR ..	24.50	28.75	30.25	34.50	32.25	36.50
714	32	16	7	35½	19½	8¾	TERSE ..	32.00	37.00	37.75	42.75	39.75	44.75
715	30	20	8	33½	23½	9¼	THUMB .	38.00	44.00	44.50	50.50	46.50	52.50
716	36	18	7	39½	21½	8½	TIGER ..	41.00	47.00	47.50	53.50	50.50	56.50
717	42	20	12	45½	23½	13¾	TOAST ..	72.00	80.00	80.00	88.00	84.00	92.00

All dimensions in inches. **Prices subject to discount.** Code Word for Sinks with Integral Back: Add "SPLASH."
Drainboards: Sinks Nos. 707, 712, 713 and 715 are available with integral ceramic drainboards on one or both sides.

Acid-proof Sinks with Integral Drainboards

These Sinks are made of one-piece chemical stoneware, without joints—guaranteed acid, alkali and corrosion-proof **all the way through.** There are no slabs to work loose and become leaky. The corners are rounded. All surfaces are finished with our smooth "HY-GLOSS" high luster salt glaze (dark brown color) to insure easy cleaning.

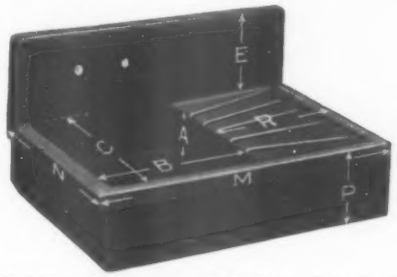


Fig. 533-ASP (with Countersunk Outlet to Take Lead Plug)
Fig. 533-BSP (with Integral Nipple Outlet and Removable Strainer)
Fig. 533-CSP (with Integral Nipple Outlet and Built-in Lute Trap)

Size No.	B	C	A	E	M	N	P	R	Shipping Wt. (lbs.)	Code Word	LIST PRICES F. O. B. FACTORY Fig. 533-ASP	Fig. 533-BSP	Fig. 533-CSP
307	18	14	7	8	37½	16½	8⅞	18	197	Tong	$50.00	$61.00	$66.00
312	20	16	7	10	39¾	19	9⅛	18	285	Tope	52.00	63.00	68.00
313-A	24	18	8	10	43¾	21	10⅛	18	348	Tory	61.00	75.00	79.00
315	30	20	8	10	49¾	23	10⅛	18	410	Tuch	83.00	97.00	101.00

Above list prices are for Sinks with drainboards at right hand or left hand. Special End-Table Sinks can be made up with back cut out for trough drainage. Corner Sinks with double integral backs can also be supplied. **List prices subject to discount.**

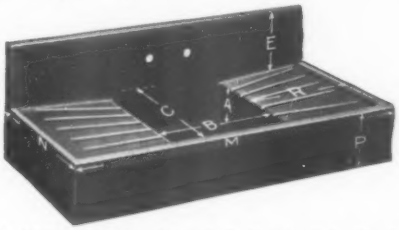


Fig. 536-ASP (with Countersunk Outlet to Take Lead Plug)
Fig. 536-BSP (with Integral Nipple Outlet and Removable Strainer)
Fig. 536-CSP (with Integral Nipple Outlet and Built-in Lute Trap)

Size No.	B	C	A	E	M	N	P	R	Shipping Wt. (lbs.)	Code Word	LIST PRICES F. O. B. FACTORY Fig. 536-ASP	Fig. 536-BSP	Fig. 536-CSP
507	18	14	7	8	54	16½	8⅞	18	284	Trew	$76.00	$91.00	$96.00
512	20	16	7	10	56	19	9⅛	18	402	Trig	78.00	93.00	98.00
513-A	24	18	8	10	60	21	10⅛	18	477	Trow	92.00	108.00	114.00
515	30	20	8	10	66	23	10⅛	18	546	Tude	125.00	141.00	145.00

Special End-Table Sinks can be made up with back cut out for trough drainage. Corner Sinks with double integral backs can also be supplied. **List prices subject to discount.**

H_2S Gas Generators

A time-saver, labor-saver and money-saver for every laboratory. There are no complicated internal parts and no internal gas tubing.

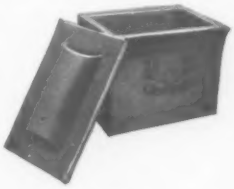
Offered in five standard stock sizes.

Suction Filters

Ten standard stock sizes are available. Recommended for filtration of corrosive acids and chemicals. "FILTERSTONE" Porous Filter Plates are also available.

Write for Bulletin No. 403.

Developing Tanks



Our line includes Developing Tanks, Trays, Hypo Vats and Solution Jars for handling all sizes of films and plates.

Ask for Bulletin No. 108.

Acid-proof Pots

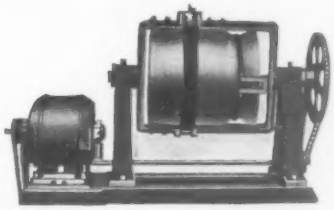
For acids, alkalies and corrosive chemicals. Stock items include all sizes of Jars and Pots, with or without outlets, etc. Rectangular Tanks can also be supplied.

You should have our Bulletin No. 404.

Funnels

We offer the most complete line of Funnels—either in the plain or buechner types—in a total of thirteen standard sizes.

Ask for Bulletin No. 405.



Jar Mills

We have a standard Jar Mill for every grinding or mixing job.

Write for Catalog No. E-4.

Other Acid-proof Items for Laboratory Use:

Acid Pitchers
Ball Mills
Boiling Kettles
Buechner Funnels
Cements, Acid-proof
Dichromate Baths
Distilled Water Tanks
Drain Boards
Electric Mixers
Evaporating Dishes
Exhausters, Acid-proof
Filter Plates (Porous)
Kjeldahl Equipment
Laboratory Chlorine Cells
Mariotte Bottles
Mortars and Pestles
Photographic Developing Tanks
Porcelain, Chemical
Slop Jars
Stills
X-Ray Developing Tanks

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AMERSIL

Manufacturers of

American Fused Silica Products

88 Cypress Ave., New York, N. Y.

AMERSIL

"AMERSIL" PRODUCTS FOR THE SCHOOL AND COLLEGE LABORATORY

"Amersil" (The trade name of American-made Fused Silica and Quartz Glass for use in laboratories, chemical plants, electrical insulation, etc.) can frequently be used in place of platinum and other expensive laboratory apparatus, and for many purposes, particularly where high or rapid changing temperatures are encountered, is much superior to glass, porcelain and similar materials. **Amersil** products are made of the very purest silica or Brazilian rock crystal containing approximately 99.8% $SI.O_2$, fused and shaped by a process developed exclusively by **Amersil** engineers. **Amersil** products have remarkable properties, which are characteristic only of the highest quality Fused Silica and Quartz.

1. **Resistance to corrosion**—Most acids have no effect whatever on **Amersil**.
2. **Resistance to high temperatures**—**Amersil** products will withstand much higher temperatures than are possible with other ceramic materials.
3. **Resistance to temperature changes**—**Amersil** can be heated white-hot and thrown into cold water without damage, owing to its extremely low coefficient of expansion.
4. **Resistance to electricity**—**Amersil** has a higher dielectric value than porcelain, glass or other insulating materials, and retains this superiority at high temperatures over any known insulator.

The standard line of **Amersil** products includes:

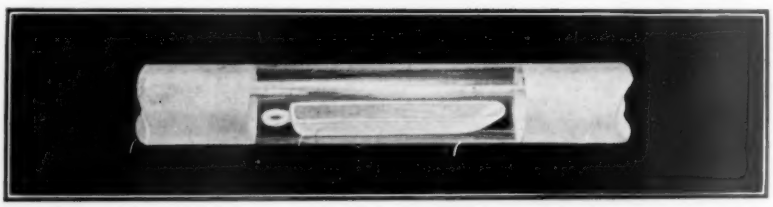
1. **Laboratory Supplies**, made of either opaque or translucent fused silica or the purest transparent quartz glass—including beakers, crucibles, evaporating dishes, capsules, trays, tubing, combustion tubes, muffles, flasks, retorts, pyrometer wells, etc.
2. **Factory Equipment**, made of sand surfaced fused silica.

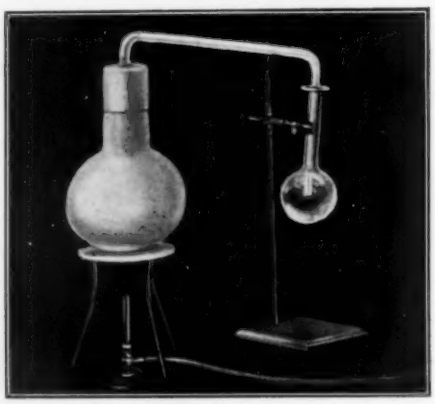
EVAPORATING DISHES are made in two styles — flat, with lip, or round bottom with lip (as illustrated). Sizes: Capacity of 10cc. to 500cc., Diameter 30mm. to 125mm.

CRUCIBLES are of two types: porcelain shape, and platinum shape as illustrated. This model comes in four sizes: Capacity 20, 30, 50 or 100cc., Diameter 1⅜", 1 11/16", 2" and 2⅞".

At Right—COMBUSTION TUBE (with transparent section), made in sizes as follows: Bore ⅝", ¾", ⅞" or 1"; Overall Length 24" or 30"; sand surface or glazed outside.

Below—KENDALL DISTILLING APPARATUS, consisting of a 3-liter opaque still with ground over cover, connecting tube with disc and a 500cc. transparent plain flask.





In addition, **Special Articles** are made to individual specifications, of either fused silica or highest grade transparent quartz glass—including such articles as Multiple Bore Tubing, Thermal Expansion Apparatus, Mercury Vacuum Pumps, Kendall Distilling Apparatus and Gas Rectifiers. Much laboratory apparatus which you may formerly have found necessary to order abroad can now be made up for you in our convenient factory in this country, at lower cost and considerable saving in time. Many college laboratories, as well as industrial concerns, have testified that **"Amersil"** is at least equal in quality to any similar products now in the market.

CORNING GLASS WORKS

World's Largest Makers of Technical Glassware

DEPT. 79, Laboratory and Pharmaceutical Division,
CORNING, N. Y.

New York Office: 501 Fifth Ave.

Pyrex Glassware is the choice of experienced chemists and laboratories throughout the world, because it is readily obtainable in any supply house, in all desirable forms for laboratory work, and because it possesses a strength, ruggedness and durability that cannot exist in ware of ordinary composition. It is the only laboratory ware that fully meets the requirements of daily usage and exacting chemical processes.

An extremely low expansion coefficient provides resistance to damage from excessive heat and sudden temperature changes.

High chemical stability almost completely avoids attack from ordinary reagents.

Heavy walls and substantial enduring strength afford added protection under constant rough and hurried handling.

When a valuable piece does break, mending is often possible, with the repair fully as dependable and useful as the original structure.

Heating with a burner and blast permits innumerable changes of contour, bending of tubes without breakage losses, and by heating to the fusing temperature, two pieces are easily welded together.

Standard forms include 40 types of flasks, twenty types of tubes and an unlimited variety of beakers, reagent bottles, crystallizing and evaporating dishes, graduates, plain cylinders, desiccators, funnels, seals, ground joints, stop cocks, etc., such as are used in ordinary work.

Many special pieces can be fabricated from standard forms right in the laboratory and complicated special equipment or pieces made to specification can be furnished from the factory for prompt delivery and at reasonable cost.

By equipping your laboratory throughout with PYREX Ware, you will minimize breakage losses and expense, you can get exactly what you need, and will have no trouble in obtaining hurried duplications.

Ask your nearest dealer for the PYREX Laboratory Glassware Price Catalog, or write direct to us.

These trade-marks designate products of Corning Glass Works. They are synonymous with highest quality in materials and workmanship

THE ELECTRIC STORAGE BATTERY CO.

World's Largest Manufacturers of Storage Batteries for Every Purpose

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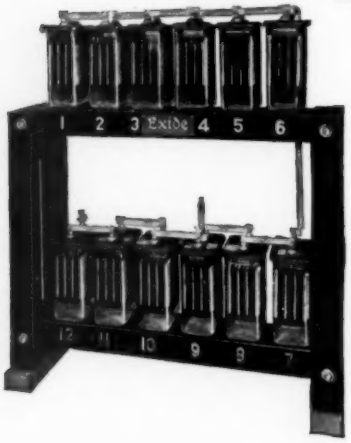

12-CELL EXIDE CHLORIDE BATTERY FOR LABORATORY SERVICE

EXIDE LABORATORY BATTERIES

Any Amount of Current at Any Voltage

Exide Batteries are used in the laboratories of the nation's foremost experimental scientists and engineers as well as in the laboratories of our most progressive universities, colleges and schools. The design and construction of Exide Batteries is the result of a wide experience gained through 44 years of building batteries for every purpose.

Exide Laboratory Batteries are absolutely dependable. At all times they assure an adequate, steady flow of current for any experiment which you or your students may be conducting. Furthermore, when installed the battery provides a wide range of voltages using combinations of cells from one to hundreds, thus providing the greatest possible operating flexibility.

Exide Laboratory Batteries can be supplied to furnish any amount of current at any voltage selected.

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Fire Alarm
Interior Telephones
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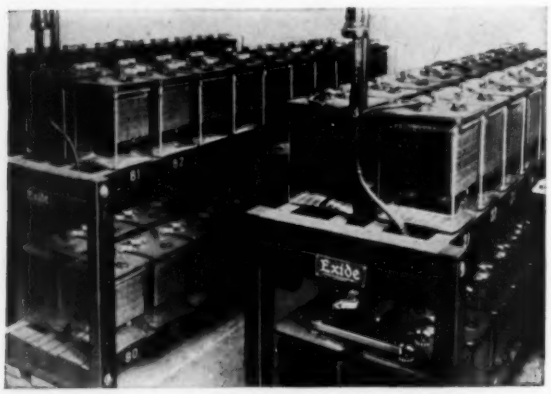
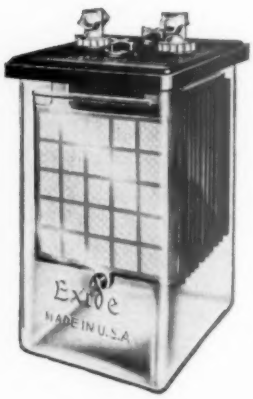
Exide
BATTERIES

For
Automatic and Instantaneous Emergency Light and Power
See Page 92



Left—120-CELL EXIDE CHLORIDE LABORATORY BATTERY IN USE AT CRUFT LABORATORY, HARVARD UNIVERSITY, CAMBRIDGE, MASS.

Right—AN EXIDE CHLORIDE LABORATORY BATTERY CELL; SEALED GLASS JAR ASSEMBLY



GENERAL CERAMICS COMPANY

Manufacturers of

High Grade Acid-Proof Chemical Stoneware

71 West 35th St., New York, N. Y.

Chicago, Ill., 208 South La Salle St.
San Francisco, Calif., 276 Monadnock Bldg.
Montreal, Que., 1009 University Tower
Buffalo, N. Y., 306 Jackson Bldg.
Plants at Keasbey and Metuchen, N. J.

Facilities

Being the largest concern in the United States manufacturing Acid-Proof Chemical Stoneware, we have unsurpassed facilities for the manufacture of a complete line. This, together with 25 years of practical experience in this line, insures the highest standard of work, prompt shipment and reasonable prices.

Advantages

Here are some of the advantages of General Ceramics Chemical Stoneware:

It is vitrified thoroughly **all the way through.** Does not depend on an applied glaze or veneer for its acid-resisting properties.

Guaranteed to be tight, non-porous and impenetrable by acids, alkalies and other strongly corrosive substances. No loss through leaks. No contamination of products. No hazard to employes or property.

Scientifically shaped and proportioned safely to withstand mechanical shock. Lasts indefinitely. Requires no upkeep or repairs.

Our large stock enables us to make immediate shipment of standard shapes and designs. Special designs can be also furnished promptly.

Guarantee

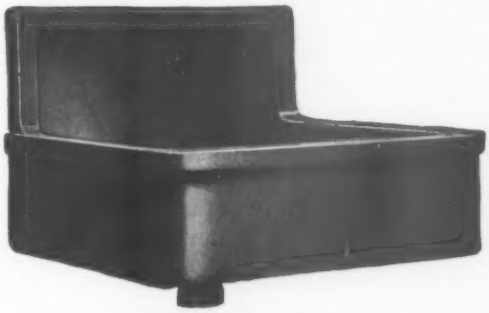
We will not knowingly permit a customer to remain dissatisfied with any transaction.

Services

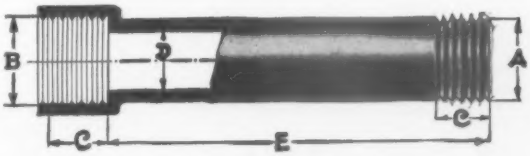
Our Engineering Department is maintained to assist in the selection of the proper and most economical stoneware equipment for any requirement and in designing stoneware plants and apparatus to meet specific requirements, without imposing any obligation upon the engineer, architect or owner.

Literature

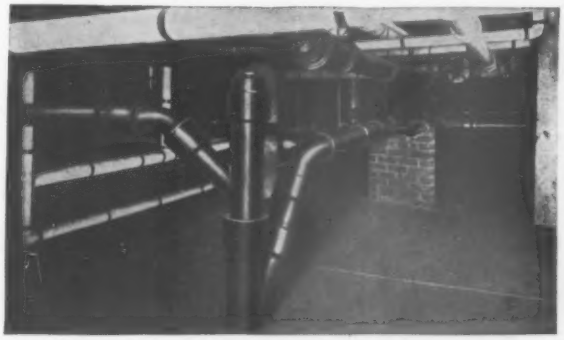
Write for our Catalog showing complete line, dimensions, etc., also price list.



LABORATORY SINK



SOCKET PIPE



GENERAL CERAMICS ACID-PROOF CHEMICAL STONEWARE IN STERLING CHEMISTRY LABORATORY, YALE UNIVERSITY, NEW HAVEN, CONN.

GENERAL ELECTRIC COMPANY

General Office: Schenectady, New York

SALES OFFICES IN PRINCIPAL CITIES

EDUCATIONAL LABORATORY EQUIPMENT

While the usual commercial sizes of electric apparatus are available at educational prices, it is recognized that for the laboratory work of our schools and colleges the size and cost of much commercial apparatus, and the cost of its operation, prohibit its use.

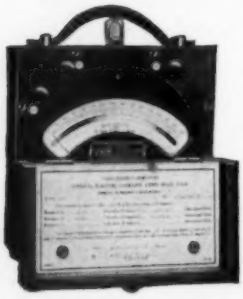
At the same time, it is desirable that the operating characteristics and physical appearance of laboratory equipment conform as nearly as possible to those of larger equipment.

For this reason, the General Electric Company has given special attention to the design and manufacture of laboratory equipment that embodies the characteristics of the corresponding commercial types.

These include:—

Generators—Synchronous, sine-wave, etc.
Motors—Synchronous, induction, etc.
Motor generator sets
Converters
Transformers
Switchboards and control equipment
Dynamometers

ELECTRIC MEASURING INSTRUMENTS



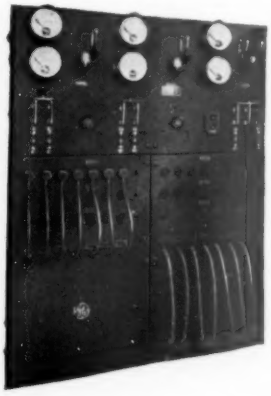
TYPE DP2 ALTERNATING CURRENT WATTMETER

No apparatus in the college laboratory is of more importance than electric measuring instruments. A well-equipped laboratory will need an assortment of standard instruments of all types and capacities, since there is hardly an experiment performed by the students which does not require their use.

When selecting laboratory instruments, too much care cannot be given to accuracy, permanence of calibration, dead-beat indications, and legibility of scales. Of course, local disturbances should not influence readings, and in many cases low internal losses are important. In the design and construction of G-E electric measuring instruments, careful consideration is given to all of these details.

Indicating and recording instruments available include: Meters—voltmeters, ammeters, wattmeters, polyfrequency meters, frequency meters, temperature recorders, and numerous others. Instruments can be designed for specific need if these needs are not met by standard equipment. Oscillographs, also, are available for viewing or recording transient phenomena.

SWITCHGEAR



Switchgear has been designed specifically for laboratory needs where a flexible method of distribution is needed. The illustration shows a distribution panel designed to distribute 110 volts Alternating Current and 125 and 8 volts Direct Current to any or all of 14 test tables. Panels, however, can be designed for any specific requirements. A motor-generator set is available for use in conjunction with switchboards for generating the various voltages.

VACUUM TUBES

The General Electric Company is actively developing and manufacturing all kinds of vacuum tubes for use in both experimental and commercial applications. Vacuum tubes are used extensively in the control of lighting school rooms, outdoor signs, theatre stages, etc. They are also used in instruments and numerous industrial control applications.

Write for the complete booklets, "Electrical Laboratory Apparatus," and "Laboratory and Shop Equipment for Electrical Departments of Technical Schools and Junior Colleges."

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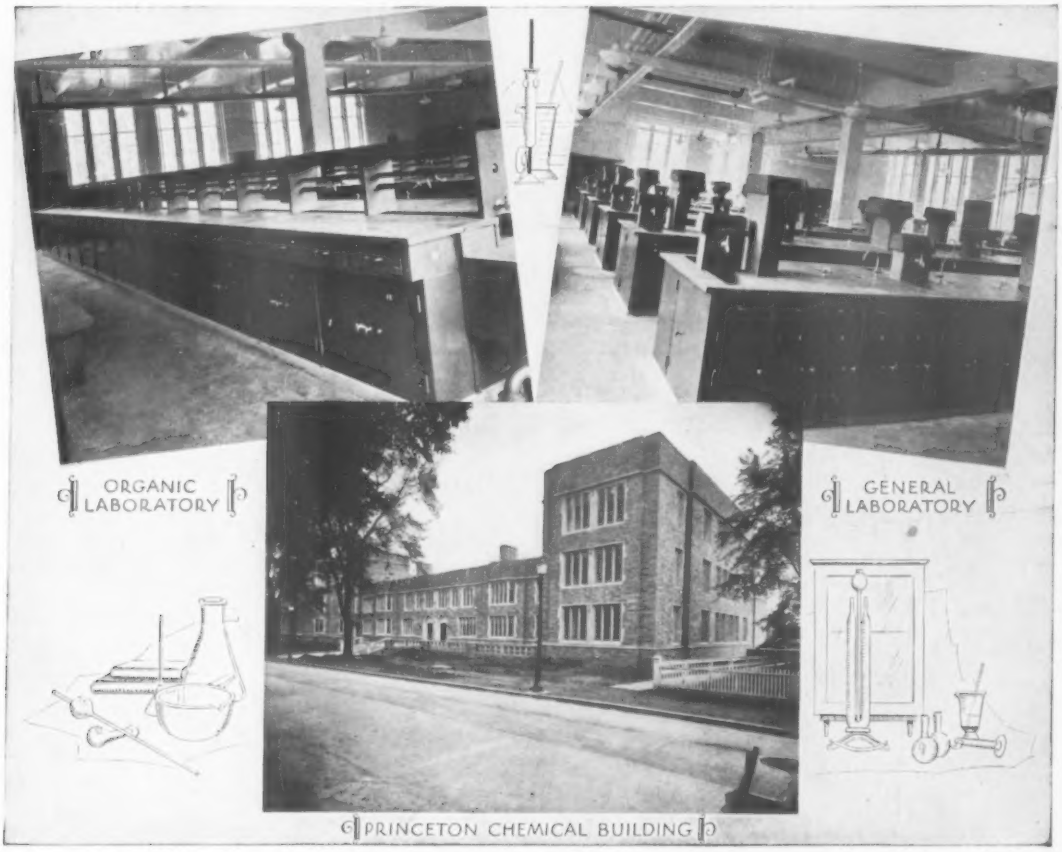
**LABORATORY AND HOSPITAL STEEL CASE-WORK
LABORATORY DESKS AND TABLES, OFFICE EQUIPMENT, STORAGE AND LIBRARY SHELVING**

Laboratory Desks and Tables of GF All-steel possess many advantages not common to other types of tables. Doors and drawers never warp, swell or split. Handles never pull off. Drawers never stick to cause broken glassware.

Built on the unit principle to facilitate installation and repairs to plumbing. Of non-combustible construction, they reduce the fire hazards of laboratories. Continuous tops of Alberene stone are proof against acids.

Below are illustrations of this equipment in new Frick Chemical Laboratory, Princeton University.



Charles Z. Klauder, Architect

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GRASSELLI
C. P. NITRIC ACID
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C. P. HYDROCHLORIC ACID
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GRASSELLI has been manufactuing chemicals since 1839. Our Quality Pledge, well known to every chemical user, is established assurance for you that all GRASSELLI C. P. products are of highest quality, always dependable, and strictly chemically pure. The analysis is printed on each label. Our numerous branches, listed above are for the purpose of serving you better.

Now packed in the new shipping case illustrated below. While it is of ample strength to guarantee safe transportation, this case saves freight expense because of its light weight. . . . For your convenience, the case is built to be easily opened (no nails to pull) and is just as easily closed for returning, when bottles are emptied. . . . The interior is so built that there is no packing in contact with the bottles and, therefore, labels are always clean and legible.

THE HOLTZER-CABOT ELECTRIC CO.

Manufacturers of Electric Signaling and Protective Systems

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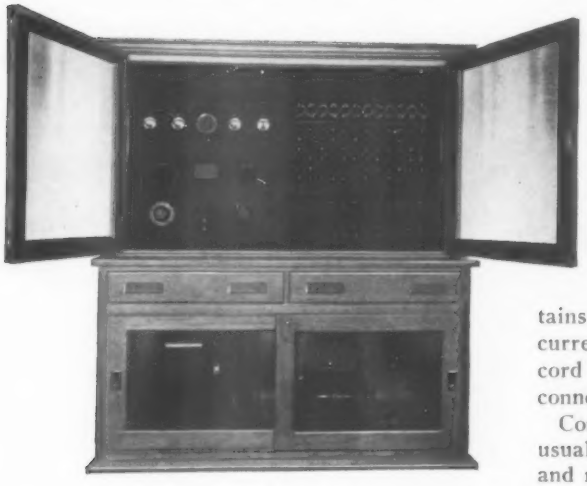
* Agencies. All Other Offices Listed Are Strictly Company Maintained and Operated with Sales Engineers in Charge to Render Complete Engineering Service.

ELECTRICAL EQUIPMENT FOR SCIENCE LABORATORIES



For supplying the various kinds of current required for electrical experiments and for the most convenient control and distribution of same to the work benches, the Holtzer-Cabot Electrical Laboratory equipment meets every requirement.

The equipment consists of a storage battery, a motor generator and one or more control and distribution panels. For large schools having several laboratories, it is the usual practice to install a battery, a motor generator and a control and distribution panel in one laboratory with a distribution panel only in the other laboratories.

The Storage Battery—While any size and number of cells can be supplied, we recommend 12 cells of 40 ampere hour multiple plate batteries as meeting all ordinary conditions.

The Motor Generator—We regularly furnish a motor generator to deliver 1200 watts flat compounded, at 125 volts. Larger or smaller sizes can be furnished if desired.

The Control Panel—The standard control panel carries volt meters, ammeters, a Tungar Rectifier, and all necessary switches, rheostats, etc., for controlling the charging of the battery and the starting, stopping and voltage regulation of the motor generator.

Distribution Panel — The distribution panel varies with the number of work tables to be supplied with current. It contains for each work table to be supplied with current, a series of receptacles and a supply of cord and plugs so that varying voltages may be connected thereto.

Combined control and distribution panels are usually supplied in two sections as shown in cut, and may be enclosed in wood cabinet floor type, or in steel cabinet to set in wall or to mount on pipe supports from the floor.

Sub Panels—By installing in other laboratories additional distribution panels only, current from the main panel may be distributed in the same manner in any number of additional laboratories.

Science Instructors will find this equipment of great convenience and time-saving value. In addition to the convenience and absolute control of all electrical current supply which this apparatus gives the instructor, the equipment itself is of considerable educational value. All apparatus is of most modern design and of the rugged construction necessary to meet the hard service of students' usage.

Complete detailed information covering this equipment and other electrical apparatus for science laboratories is available by writing for a special bulletin on same.

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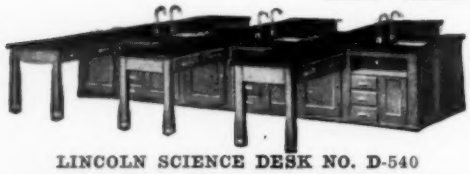
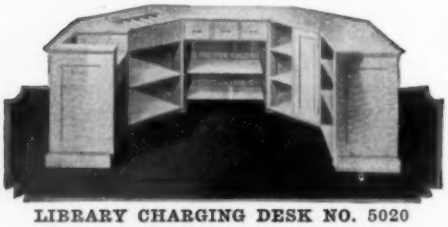


LINCOLN SCIENCE DESK NO. D-540

CHEMISTRY TABLE NO. D-677



LIBRARY CHARGING DESK NO. 5020

STUDENT'S SEWING TABLE NO. J-1601

DOMESTIC SCIENCE TABLE NO. K-1786

DRAWING TABLE NO. L-2028

KEWAUNEE OFFERS OUTSTANDING VALUE

Check Kewaunee Design—We maintain a staff of nationally prominent laboratory consultants, scientists, analysts, and research authorities, which insures Kewaunee Laboratory Furniture being scientifically, pedagogically and technically correct in every detail.

Check Kewaunee Construction — You'll find it rugged, heavy, built to give longer service.

Check Kewaunee Utility—You'll find it surpasses all others in adaptability. Kewaunee Furniture saves space and comfortably accommodates more students in classrooms.

Check Kewaunee Conveniences — You'll find every modern worth while convenience offered in Kewaunee Furniture.

Check Kewaunee Prices—You'll find Kewaunee prices the most atttractive, quality considered. Kewaunee has grown to its position of leadership by giving outstanding value.

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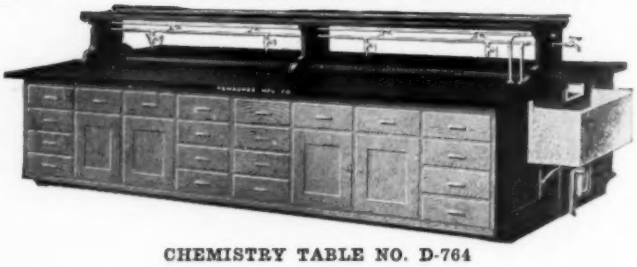
If you have Laboratory, Domestic Science, Manual Training, Sewing Room, Bookkeeping and Typewriting, Art and Mechanical Drawing or Library Furniture to buy, call on Kewaunee Engineering Service to assist you in making floor plans and furniture selections that will provide widest utility, greatest efficiency and handle the maximum number of students. This service is free and does not obligate you.

Kewaunee Laboratory Furniture is made of both wood and steel



CHEMISTRY TABLE NO. D-764

W. W. KIMBALL COMPANY

Established 1857

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Combination Laboratory 35 feet long and 22 inches wide, accommodating twenty-four pupils (all facing one way) at twelve two-pupil tables, each equipped with sink, water, gas, electricity, ample drawer and cupboard space. Provision is also made for Demonstration Table, Fume Hood, and Apparatus Cases. With this arrangement, the room may be used for demonstration and laboratory work in all of the sciences. With two side aisles, one center aisle, and cross aisles between all tables, perfect supervision is obtained with the minimum of effort by the instructor.

At Left:
Chemistry Fume Hood No. 657
—4′ 0″ x 2′ 0″ x 8′ high

At Right:
Cabinet and Supply Case No. 9565—6′ 0″ x 6′ 6″ high
Lower section—1′ 8″ deep, 2′ 10″ high
Upper section—1′ 3″ deep, 3′ 8″ high

Educational—Industrial—Clinical and Research Laboratory Furniture for Physics—Chemistry—Agriculture—Biology—Home Economics and Allied Arts. Built to your specifications or standard designs

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INCORPORATED 1918

Laboratory and Research Electrical Measuring Instruments

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Earl N. Webber, Daily News Bldg., Chicago, Ill.

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TYPE 501 MICROAMMETERS, MILLIAMMETERS, MILLIVOLTMETERS, and VOLTMETERS

Single Ranges—
From 3 microamperes to 1 ampere, full scale.
From 1 millivolt to 1000 volts, full scale.

Multi-ranges—
From 4 microamperes to 1 ampere, full scale.
From 2 millivolts to 1000 volts, full scale.

Multimeters — 14 Ranges—
1 microampere to 1 ampere. 20 microvolts to 1000 volts.

TYPE 502 THERMAL A.C. MILLIAMMETERS and VOLTMETERS

Can be used on A.C. or D.C.

Single Ranges—
From 1 milliampere to 1 ampere, full scale.
From 0.25 volt to 1500 volts, full scale.

Multi-ranges—
From 2 milliamperes to 1 ampere, full scale.
From 0.3 volts to 1500 volts, full scale.

Multimeters—14 Ranges—
From 2 milliamperes to 5 amperes.
From 60 millivolts to 1500 volts.

TYPE 515 THERMOCOUPLES

In Vacuo—From 2 milliamperes to 1 ampere.
In Air—From 0.5 ampere to 10 amperes.
Specials—For use on short wave frequencies.

TYPE 504 FLUXMETERS

For measurement of magnetic flux in maxwells or gausses, with electrical zero return. These are strictly portable and need no leveling.

TYPE 505 SWITCHBOARD PATTERN METERS and TYPE 507 SMALL METERS

TYPE 505

TYPE 507

Same ranges as Type 501. These cannot be supplied with internally mounted thermocouples.

TYPE 520 WATTMETERS—From 0.1 watt full scale up. Especially suitable for use on circuits having low power factors.

TYPE 520 DYNAMOMETER MILLIAMMETER and VOLTMETERS—From 10 milliamperes and 0.5 volt up; full scale.

OHMMETERS, TYPE 701—With self-contained battery and magnetic shunt to compensate for battery ageing. Suitable for measuring low coil resistances up to insulation resistance in megohms.

TYPE 704—Cross coil, independent of ± 20% battery ageing. From 1 ohm to 1000 megohms.

TYPE 508

TYPE 508 ELECTROSTATIC VOLTMETERS

No power consumption on D.C. and very little on A.C. Full scale ranges from 120 to 3000 volts, and up to 40,000 volts by the use of condenser multipliers. Measures true R.M.S. values. Special high ranges built on request.

TYPE 503 SEMI-SUSPENDED MICROAMMETERS MILLIAMMETERS and MILLIVOLTMETERS

The most sensitive portable meters manufactured. Although movement is carried on a suspension, the meter needs no leveling. Full scale ranges from 0.5 microampere and 0.1 millivolt up. Also supplied in multiranges.

Type 5053—Similar to Type 505 but with semi-suspension element. Ranges from 0.75 microampere and 0.24 millivolt up.

Type 5073—Similar to Type 507 but with semi-suspension element. Supplied in same ranges as Type 503. Price approximately 30% less than Type 503.

TYPE 503

TYPES 602A and 602B ELECTRONIC MICROAMMETERS, MILLIAMMETERS, MILLIVOLTMETERS and VOLTMETERS

TYPES 602A AND 602B

Entirely new in principle and provide a ready means for measurement of much smaller A.C. values in current and voltages than has heretofore been thought possible. **Chief features:** highest sensitivity; lowest resistance on current; exceptionally high resistance on voltage. Will withstand heavy overloads without damage. Ranges full scale currents from 1 microampere, and voltages from 10 millivolts.

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The Spencer Lens Company have been pioneers in microscope-building, the first Spencer microscopes being made more than 75 years ago. They were the first to build apochromatic objectives; the first, and for a dozen years the only, manufacturer in America to build microscopes with side fine-adjustments; the originators of the attachable mechanical stage that clamps on the side of a microscope; the originators and only builders of fork-type substages, converging tube binocular microscopes, combination binocular and monocular body all in one, combination substage condenser and dark-field illuminator. In short, most of the improvements in microscope construction during recent years have originated in our factory.

Most laboratory workers prefer Spencer microscopes not merely because the Spencer Company were pioneers, but because they have continued to pioneer all down through the years up to the present day.

SPENCER
NOS. 55 AND 56

SPENCER NOS. 55 AND 56

These exceptionally large instruments meet in a most satisfactory way the demand for a large stage. The plate glass stage is 100 mm. x 100 mm. Objects in the center of a dish 50 mm. high and 130 mm. in diameter may be brought into the lines of vision. (Illustrated above.)

SPENCER
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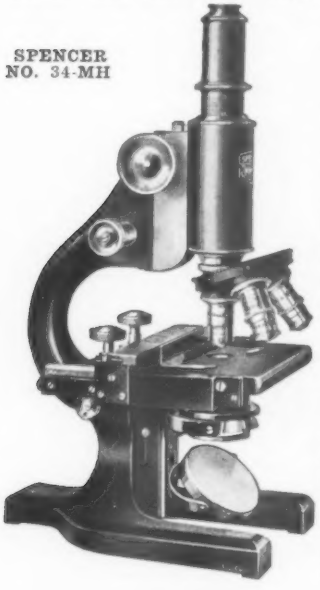

SPENCER NO. 34-MH

This laboratory microscope embodies all features essential for good practical diagnosis. The mechanical stage is permanently attached, having a range of motion sufficient to cover the 3″ x 2″ microscope slides. Objects and objective buttons are chromium plated for durability and, with the black enamel finish of the microscope itself, add to the general beauty of the instrument. It is the perfect microscope for the medical student's use.

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Microscope No. 64 with side-fine adjustment, lever type, is an ideal instrument for high school or college use where simplicity and durability are paramount considerations. It is easy to use, rugged in design, and has a superior type of fine adjustment, with 34 threads of the screw engaged instead of the usual one or two.

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STANDARD LABORATORY EQUIPMENT
(Approved by Underwriters)

General

This equipment consists of current distribution and control panel, motor generator and storage battery. The apparatus is used in physics, chemistry, biology and electrical laboratories, and any other places where electricity is desired for experimental purposes.

Panel

The experimental board consists of a jack panel and a control panel. The jack panel is furnished with a double pole receptacle for the termination of each table circuit, also current supply jacks for low and high voltages D.C. and A.C. The arrangement is such that all table circuits may be furnished with the same or different voltages simultaneously. This is accomplished by plugging flexible connectors from current supply jacks into the table circuit jacks.

The control panel contains all necessary voltmeters, ammeters, switches, transformer, rheostats, etc., for the control of the motor generator and charging of storage battery. The cut shows a 22-table circuit panel.

Motor Generator

The motor generator is furnished usually to supply from 80 to 115 v. D.C. where this is not otherwise available in the building. The size and type of machine depends entirely upon needs of the institution.

Storage Battery

Storage batteries of various capacities and number of cells are furnished to give the range of low D.C. voltages. Taps are taken off the battery at various points and connected to the battery jacks on panel.

Flexibility

This equipment has a great flexibility of use in that various groups of students may work on different experiments requiring different voltages at the same time. The apparatus appeals to all people who teach electricity. Panels are designed and built to meet the particular requirements of the school in which they are installed as well as to conform fully to underwriters' requirements.

We are always glad to make suggestive layouts and submit prices covering special needs.

Ask for literature or our representative to call.

See pages 82 and 83 for electric clock and fire alarm systems.

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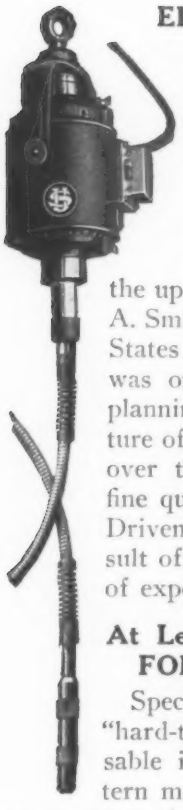


ELECTRICALLY DRIVEN TOOLS for WOOD-WORKING SHOPS, SHEET METAL SHOPS, Etc.

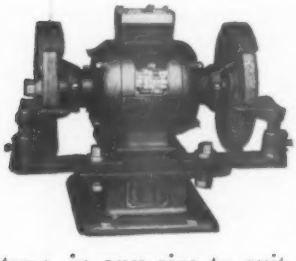
"The Good Mechanic's Choice"

The United States Electrical Tools shown on this page are indispensable for the up-to-date school shop. John A. Smith, President of the United States Electrical Tool Company, was one of the pioneers in the planning, design and manufacture of electric drills and grinders over thirty years ago, and the fine quality of U. S. Electrically Driven Tools of today is the result of the Company's long years of experience.

At Left: U. S. UNIVERSAL FORM FILING MACHINE

Specially designed for those "hard-to-get-at" places—indispensable in die making, metal pattern making, wood pattern making, ornamental metal works, etc.—a great time- and labor-saver for finishing castings and moulded parts.

U. S. BALL BEARING BENCH AND PEDESTAL GRINDERS



U. S. Ball Bearing Grinders are designed for continuous heavy duty service. Can be furnished in bench or pedestal type, in any size to suit the particular use desired.

When ordering, state current characteristics.

U. S. PORTABLE ELECTRIC DRILLS

¼-inch to 2-inch

The U. S. Drill, "The Good Mechanic's Choice," for more than 30 years, incorporates all of the best principles of electric drill manufacturing—super power, ruggedness, durability, etc. Use one and convince yourself.

U. S. UNIVERSAL DISC SANDER

7-inch and 9-inch

This necessary tool for body shops, woodworking plants, fender repair shops and sheet metal shops is ideal for use any place where a polish is required on wood or metal, and in places where it is convenient to use a portable tool on large surfaces. The flexibility of the disc permits covering a surface without danger of gouging.

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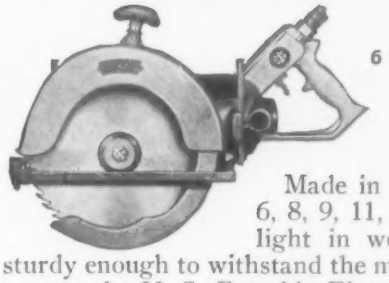

Blades 6 to 12 inches

Made in five sizes: 6, 8, 9, 11, 12 inches, light in weight yet sturdy enough to withstand the most severe usage—the U. S. Portable Electric Saw is the good mechanic's choice.

Write us for specifications.

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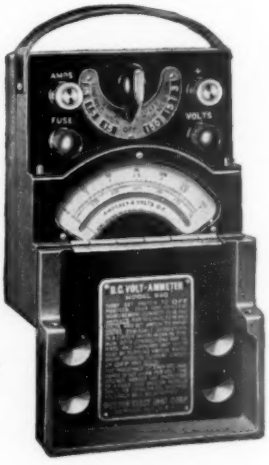
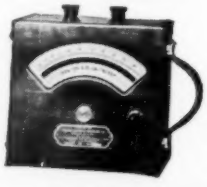
Wherever electrical tests are made, there is no single measurement which does not derive its authenticity from an original Weston discovery or invention. The use of Weston instruments in schools and scientific laboratories has become as thoroughly established as the art of measurement itself. It is a fixed principle that only "Westons" should be used in the study of electricity, just as Ohm's Law is a fundamental part of the student's educational groundwork. Only the most exacting standards of craftsmanship and accuracy should be offered the student as examples of the precise work which makes for progress and success in the professional and scientific field. And that means "Westons"—the electrical measurement standards of the world. Following are a few of the many hundreds of models shown in the Weston catalog—these being particularly recommended for school equipment.

MODEL 540, PORTABLE D. C. VOLT-AMMETERS (Fuse-Protected)

Made with six ranges. Independent replaceable fuses protect each of the three current and three potential ranges. Solid, compact bakelite case. Instrument provided with Mirror scale. Quick range-changing switch. Precision type, pocket-size instrument. Reasonably priced.



MODEL 155, PORTABLE A. C. AMMETERS AND VOLTMETERS



For general alternating current testing. Movable iron type. Accuracy, within ½ of one per cent. For use on commercial frequencies. Can also be used for direct current testing.

MODEL 45, PORTABLE D. C. AMMETERS AND VOLTMETERS

Permanent magnet movable coil type instruments for general testing. Shielded from the effects of external magnetic fields. Accuracy, within ½ of one per cent.

MINIATURE PORTABLE A. C. TEST SETS

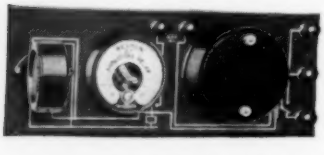
Handy, compact, light-weight instruments enclosed in durable bakelite cases, furnished with leather carrying case. Model 539 Current Transformer; Model 528 One-Ampere Ammeter; Model 528 Voltmeter. Testing range from 0.2 to 200 amperes. Voltmeters can be supplied in various combinations of voltages. All instruments can be ordered singly, if preferred.

OTHER WESTON PRODUCTS

The Weston line covers every field of electrical testing. Write for your copy of our latest Catalog containing descriptive information and prices with reference to hundreds of models and many thousand range combinations.

MODEL 607 PHOTO-ELECTRIC CELL [LECTURE DEMONSTRATION APPARATUS]

Ideal to demonstrate the theory and operation of photo-electric cells and sensitive relays. Complete functioning unit. No amplifier needed. Wiring diagram engraved into the base. Uses the new Weston Photronic Cell. Simple, easy to set up, low-priced.



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Established 1856

Manufacturers of

Wickes Complete Blue Printing Equipment

SAGINAW, MICHIGAN

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Hundreds of schools are now using Wickes Brothers equipment in their drafting rooms—Wickes Blue Printing Machines, Washers and Electric Dryers—so low in first cost, so economical in operation, so simple and safe to operate, and so compact, that practically every school can afford to teach its students real industrial practice.

WICKES CONTINUOUS ELECTRIC BLUE PRINTING MACHINE

THE WICKES WASHER

The Wickes Horizontal Blue Print Washer washes prints speedily and without muss and bother, and is extremely durable. The washing tank (36 x 48 inches) is of strong sheet metal on angle iron legs, with sufficient slant so water will run rapidly from the prints that are being washed. A pipe with a gang of holes to give spray effect is mounted on the back.

WICKES BLUE PRINTING MACHINES

These machines will print separately cut sheets or continuous rolls in any length and in widths from 2 to 48 inches. It is entirely automatic, the only work required of the operator being the placing of the tracing and blue print paper on the traveling belt. The prints are absolutely uniform in tone, the lines sharp and clear. All work is done in broad daylight. There is no glass cylinder to clean, break or replace. Extremely simple in operation, this machine will outprint any other machine per unit of electricity consumed. **Made in two models.**

WICKES ELECTRIC DRYER IN OPERATION

THE WICKES ELECTRIC DRYER

This Dryer will dispense with the old method of hanging prints on racks to dry, thereby doing away with drippings and conserving floor space. A revolving seamless steel cylinder insures a steady, even heat at all times. It will take blue prints up to 46 inches in width, and in unlimited lengths. Operation is continuous, and as nearly automatic as possible.

Write for catalogs.

WICKES HORIZONTAL BLUE PRINT WASHING TANK

Section IX

COLLEGE, UNIVERSITY AND NORMAL SCHOOL PRESIDENTS

In the United States and Canada, for the 1932-1933 College Year

(Normal school principals are designated by an asterisk)

City	*Institution*	*President*
Alabama		
Athens	Athens College for Young Women	E. R. Naylor
Auburn	Alabama Polytechnic Institute	Bradford Knapp
Birmingham	Birmingham-Southern College	Guy E. Snavely
Birmingham	Howard College	T. V. Neal
Daphne	State Normal School	D. R. Murphey
Florence	State Teachers College	H. J. Willingham
Jacksonville	State Teachers School	C. W. Daugette
Livingston	State Teachers College	G. W. Brock
Marion	Judson College	L. G. Cleverdon
Montevallo	Alabama College	O. C. Carmichael
Montgomery	State Teachers College	H. C. Trenholm
Montgomery	Woman's College of Alabama	Walter D. Agnew
Normal	State Agricultural & Mechanical Institute	J. F. Drake
St. Bernard	St. Bernard College	Bernard Menges
Selma	Selma University	Wm. Wade Ryan
Spring Hill	Spring Hill College	Joseph M. Walsh
Talladega	Talladega College	F. A. Sumner
Troy	State Teachers College	E. M. Shackelford
Tuskegee	Tuskegee Institute	Robert R. Moton
University	University of Alabama	George H. Denny
Arizona		
Flagstaff	Arizona State Teachers College	Grady Gammage
Tempe	Arizona State Teachers College	Ralph W. Swetman
Tucson	University of Arizona	H. LeRoy Shantz
Arkansas		
Arkadelphia	Henderson State Teachers College	J. P. Womack
Arkadelphia	Ouachita College	Charles D. Johnson
Batesville	Arkansas College	Ury McKenzie
Clarksville	The College of the Ozarks	Wiley Lin Hurie
Conway	Arkansas State Teachers College	H. L. McAlister
Fayetteville	University of Arkansas	John C. Futrall
Little Rock	Arkansas Baptist College	S. P. Nelson
Little Rock	Little Rock College	John J. Healy
Morrilton	Harding College	J. N. Armstrong
Pine Bluff	Arkansas State College	John B. Watson
Searcy	Hendrix College and Galloway Woman's College	J. H. Reynolds
California		
Angwin	Pacific Union College	William E. Nelson
Arcata	Humboldt State Teachers College	Arthur S. Gist
Berkeley	University of California	Robert G. Sproul
Chico	State Teachers College	A. J. Hamilton
Claremont	Pomona College	C. K. Edmunds
Claremont	Scripps College	Ernest J. Jaqua
Fresno	State Teachers College	F. W. Thomas
Hollywood	Immaculate Heart College	Sister Margaret Mary, Dean
La Verne	La Verne College	Ellis M. Studebaker
Los Angeles	California Christian College	Cecil F. Cheverton
Los Angeles	Loyola University at Los Angeles	Hugh M. Duce
Los Angeles	Mount St. Mary's College	Sister Margaret Mary
Los Angeles	Occidental College	Remsen D. Bird
Los Angeles	University of California at Los Angeles	Ernest C. Moore, V. Pres. & Provost
Los Angeles	University of Southern California	R. B. von KleinSmid
Oakland	College of the Holy Names	Sister Mary Redempta
Oakland	Mills College	A. H. Reinhardt
Pasadena	California Institute of Technology	Robert A. Millikan, Ch. Exec. Council
Pasadena	Pasadena College	Orval J. Nease
Redlands	University of Redlands	Victor L. Duke
St. Mary's College	St. Mary's College	Brother Leo, Chancellor
San Diego	State Teachers College	Edward L. Hardy
San Francisco	State Teachers College	Alex. C. Roberts
San Francisco	San Francisco College for Women	Mother M. Guerin
San Francisco	University of San Francisco	Edward J. Whelan
San Jose	State Teachers College	T. W. MacQuarrie
San Rafael	Dominican College	Mother M. Raymond
Santa Barbara	State Teachers College	Clarence L. Phelps
Santa Clara	University of Santa Clara	James J. Lyons
Stanford Univ.	Stanford University	Ray Lyman Wilbur
Stockton	College of the Pacific	Tully C. Knoles
Whittier	Whittier College	Walter F. Dexter
Colorado		
Alamosa	Adams State Teachers College of Southern Colorado	Ira Richardson
Boulder	University of Colorado	George Norlin
Colorado Spgs.	Colorado College	Charles C. Mierow
Denver	The Regis College	J. A. Herbers
Denver	University of Denver	F. M. Hunter
Fort Collins	Colorado Agricultural College	Charles A. Lory
Golden	Colorado School of Mines	M. F. Coolbaugh
Greeley	Colorado State Teachers College	G. W. Frasier
Gunnison	Western State College	C. C. Casey
Loretto	Loretto Heights College	Sister Mary Edmond
Connecticut		
Danbury	State Normal School	L. D. Higgins *
Hartford	Trinity College	Remsen B. Ogilby
Middletown	Wesleyan University	J. L. McConaughy
New Britain	State Normal School	Herbert D. Welte *
New Haven	Albertus Magnus College	Sister M. Isabel
New Haven	Arnold College for Hygiene & Physical Education	George D. Knight, Dean
New Haven	State Normal School	Lester K. Ade *
New Haven	Yale University	James R. Angell
New London	Connecticut College	Katharine Blunt
New London	United States Coast Guard Academy	H. G. Hamlet, Supt.
Storrs	Connecticut Agricultural College	C. C. McCracken
Willimantic	State Normal School	George H. Shafer *
Delaware		
Wilmington	University of Delaware	Walter Hullihen
District of Columbia		
Washington	The American University	Lucius C. Clark
Washington	Catholic University of America	James H. Ryan, Rector
Washington	Gallaudet College	Percival Hall
Washington	Georgetown University	Coleman Nevils
Washington	George Washington University	Cloyd Heck Marvin
Washington	Howard University	M. W. Johnson
Washington	National University	Hayden Johnson
Washington	St. John's College	Brother Dorotheus
Washington	Trinity College	Sister Julia
Washington	Washington Missionary	H. H. Hamilton
Washington	J. O. Wilson Teachers College	Edgar C. Higbie
Florida		
College Point	Bob Jones College	Robert R. (Bob) Jones
Coral Gables	University of Miami	B. F. Ashe
De Funiak Spgs	Palmer College	P. W. DuBose
Deland	John B. Stetson University	Lincoln Hulley
Gainesville	University of Florida	John J. Tigert
Lakeland	Southern College	Ludd M. Spivey
St. Leo	St. Leo College	Francis Sadlier
Tallahassee	Florida Agricultural & Mechanical College	J. R. E. Lee
Tallahassee	Florida State College for Women	Edward Conradi
Winter Park	Rollins College	Hamilton Holt
Georgia		
Albany	Georgia Normal & Agricultural College	J. W. Holley
Americus	American Normal College	J. M. Prance

City	Institution	President
Athens	Georgia State Teachers College	Jere M. Pound
Athens	University of Georgia	S. V. Sanford
Atlanta	Atlanta University	John Hope
Atlanta	Clark University	M. S. Davage
Atlanta	Georgia School of Technology	Marion L. Brittain
Atlanta	Morehouse College	S. H. Archer
Atlanta	Morris Brown College	W. A. Fountain, Jr.
Atlanta	Spelman College	Florence M. Read
Augusta	Paine College	E. C. Peters
Bowdon	Bowdon State Normal & Industrial College	George W. Camp
Collegeboro	South Georgia Teachers College	Guy H. Wells
Dahlonega	North Georgia College	John W. West
Decatur	Agnes Scott College	James R. McCain
Demorest	Piedmont College	Henry C. Newell
Douglas	South Georgia State College	J. M. Thrash
Emory University	Emory University	Harvey W. Cox
Forsyth	Bessie Tift College	Aquila Chamlee
Gainesville	Brenau College	H. J. Pearce
LaGrange	La Grange College	W. E. Thompson
Macon	Mercer University	Spright Dowell
Macon	Wesleyan College	Rice R. Anderson
Milledgeville	Georgia State College for Women	J. L. Beeson
Mount Berry	Berry College	G. Leland Green
Oglethorpe University	Oglethorpe University	Thornwell Jacobs
Rome	Shorter College	William D. Furry
Thomasville	Allen Normal School	Mary L. Marden *
Tifton	Georgia State College for Men	F. G. Branch
Valdosta	Georgia State Womans College	R. H. Powell
Idaho		
Albion	Albion State Normal School	C. E. Bocock *
Caldwell	The College of Idaho	Wm. Judson Boone
Lewiston	Lewiston State Normal School	J. E. Turner
Moscow	University of Idaho	M. G. Neale
Nampa	Northwest Nazarene College	Russell V. DeLong
Pocatello	University of Idaho, Southern Branch	John R. Dyer, Exec. Dean
Wesleyan	Gooding College	C. W. Tenney
Illinois		
Alton	Shurtleff College	George M. Potter
Aurora	Aurora College	Orrin Roe Jenks
Bloomington	Illinois Wesleyan University	Wm. J. Davidson
Bourbonnais	St. Viator College	John W. R. Maguire
Carbondale	Southern Illinois State Normal University	H. W. Shryock
Carthage	Carthage College	Jacob Diehl
Charleston	Eastern Illinois State Teachers College	L. C. Lord
Chicago	Armour Institute of Technology	H. M. Raymond
Chicago	Chicago Normal College	Butler Laughlin
Chicago	De Paul University	Francis V. Corcoran
Chicago	Lewis Institute	George N. Carman
Chicago	Loyola University	Robert M. Kelley
Chicago	Pestalozzi Froebel Teachers College	Bertha H. Hegner
Chicago	St. Francis Xavier College for Women	Mother M. Sophia Mitchell
Chicago	St. Stanislaus College	Thaddeus S. Ligman
Chicago	University of Chicago	Robert M. Hutchins
Decatur	James Millikin University	Jesse Haves White
De Kalb	Northern Illinois State Teachers College	Karl L. Adams
Elmhurst	Elmhurst College	Timothy Lehmann
Eureka	Eureka College	Clyde L. Lyon
Evanston	National College of Education	Edna Dean Baker
Evanston	Northwestern University	Walter Dill Scott
Galesburg	Knox College	Albert Britt
Greenville	Greenville College	Leslie R. Marston
Jacksonville	Illinois College	J. G. Ames, Acting
Jacksonville	MacMurray College	C. P. McClelland
Jacksonville	Routt College	James A. Griffin
La Grange	Broadview College	Thomas W. Steen
Lake Forest	Lake Forest College	H. McComb Moore
Lebanon	McKendree College	Cameron Harmon
Lisle	St. Procopius College	Valentine Kohlbeck
Macomb	Western Illinois State Teachers College	W. P. Morgan
Monmouth	Monmouth College	Thos. H. McMichael
Naperville	North Central College	Edward E. Rall
Normal	Illinois State Normal University	Harry A. Brown
Peoria	Bradley Polytechnic Institute	F. R. Hamilton
Peru	St. Bede College	Gilbert Bulfer
Quincy	Quincy College	V. A. Fochtman
River Forest	Rosary College	Sister Mary Ruth
Rockford	Rockford College	W. Arthur Maddox
Rock Island	Augustana College	G. A. Andreen
Urbana	University of Illinois	Harry W. Chase
Wheaton	Wheaton College	J. O. Buswell, Jr.
Indiana		
Bloomington	Indiana University	William L. Bryan
Crawfordsville	Wabash College	Louis B. Hopkins
Danville	Central Normal College	Waldo E. Wood
Evansville	Evansville College	Earl E. Harper
Fort Wayne	Concordia College	William C. Burhop
Franklin	Franklin College	Robert H. Kent, Acting
Goshen	Goshen College	Sanford C. Yoder
Greencastle	De Pauw University	G. Bromley Oxnam
Hanover	Hanover College	A. G. Parker, Jr.
Huntington	Huntington College	C. A. Mummart
Indianapolis	Butler University	Walter S. Athearn
Indianapolis	Indiana Central College	I. J. Good
Indianapolis	Normal College of the American Gymnastic Union	Emil Rath
La Fayette	Purdue University	Edward C. Elliott
Marion	Marion College	Wm. F. McConn
Merom	Union Christian College	W. S. Alexander
Muncie	Ball State Teachers College	L. A. Pittenger
N. Manchester	Manchester College	Otho Winger
Notre Dame	St. Marys College	Sister Irma
Notre Dame	University of Notre Dame	Chas. L. O'Donnell
Oakland City	Oakland City College	W. P. Dearing
Richmond	Earlham College	William C. Dennis
St. Mary of the Woods	St. Mary of the Woods College	Mother Mary Raphael
Terre Haute	Indiana State Teachers College	L. N. Hines
Terre Haute	Rose Polytechnic Institute	Donald B. Prentice
Upland	Taylor University	Robert Lee Stuart
Valparaiso	Valparaiso University	O. C. Kreinheder
Iowa		
Ames	Iowa State College of Agriculture and Mechanic Arts	R. M. Hughes
Cedar Falls	Iowa State Teachers College	O. R. Latham
Cedar Rapids	Coe College	Harry M. Gage
Clinton	Wartburg College	Otto L. Proehl
Davenport	St. Ambrose College	Martin Cone
Decorah	Luther College	Oscar L. Olson
Des Moines	Drake University	D. W. Morehouse
Dubuque	Clarke College	Sister Mary Basiline Bates, Dean
Dubuque	Columbia College	Thomas Conry
Dubuque	University of Dubuque	Paul H. Buchholz
Fairfield	Parsons College	Clarence W. Greene
Fayette	Upper Iowa University	Arthur E. Bennett
Grinnell	Grinnell College	John S. Nollen
Indianola	Simpson College	John L. Hillman
Iowa City	State University of Iowa	Walter A. Jessup
Lamoni	Graceland College	G. N. Briggs
Le Mars	Western Union College	D. O. Kime, Acting
Mount Pleasant	Iowa Wesleyan College	James E. Coons
Mount Vernon	Cornell College	H. J. Burgstahler
Oskaloosa	Penn College	H. C. Bedford, Acting
Pella	Central College	John Wesselink
Sioux City	Morningside College	Robert E. O'Brian
Sioux City	Trinity College	W. C. Tredtin
Storm Lake	Buena Vista College	Henry Olson
University Park	John Fletcher College	Joseph Owen
Kansas		
Atchison	St. Benedict's College	Martin Veth
Baldwin City	Baker University	Wallace B. Fleming
Emporia	College of Emporia	John Bailey Kelly
Emporia	Kansas State Teachers College	Thomas W. Butcher
Hays	Fort Hays Kansas State College	W. A. Lewis
Hesston	Hesston College	Edward Yoder, Act.
Lawrence	University of Kansas	E. H. Lindley
Lindsborg	Bethany College	Ernest F. Pihblad
McPherson	McPherson College	V. F. Schwalm
Manhattan	Kansas State College of Agriculture and Applied Science	Francis D. Farrell
Newton	Bethel College	Ed. G. Kaufman
Ottawa	Ottawa University	W. P. Behan, Acting
Pittsburg	Kansas State Teachers College	W. A. Brandenburg
St. Marys	St. Mary's College	George R. Kister
Salina	Kansas Wesleyan University	Larkin B. Bowers

City	Institution	President
Salina	Marymount College	Mother Mary Rose
Sterling	Sterling College	Ross T. Campbell
Topeka	Washburn College	Philip C. King
Wichita	Friends University	W. O. Mendenhall
Wichita	Municipal University of Wichita	H. W. Foght
Winfield	St. John's Lutheran College	A. M. Rehwinkel
Winfield	Southwestern College	Frank E. Mossman
Kentucky		
Barbourville	Union College	John Owen Gross
Berea	Berea College	Wm. J. Hutchins
Bowling Green	Western Kentucky State Teachers College	H. H. Cherry
Danville	Centre College	Charles J. Turck
Frankfort	Kentucky State Industrial College	R. B. Atwood
Georgetown	Georgetown College	Henry E. Watters
Lexington	Transylvania College	Arthur Braden
Lexington	University of Kentucky	Frank L. McVey
Louisville	Louisville Normal School	E. Breckinridge *
Louisville	Nazareth College	Mother Mary C. Malone
Louisville	Simmons University	M. B. Lanier
Louisville	Southern Baptist Theological Seminary	John R. Sampey
Louisville	University of Louisville	Raymond A. Kent
Morehead	Morehead State Teachers College	J. Howard Payne
Murray	State Teachers College	Rainey T. Wells
Richmond	Eastern Kentucky State Teachers College	H. L. Donovan
Wilmore	Asbury College	Lewis R. Akers
Winchester	Kentucky Wesleyan College	R. V. Bennett
Louisiana		
Baton Rouge	Louisiana State University and Agricultural & Mechanical College	James M. Smith
Baton Rouge	Southern University	J. S. Clark
Lafayette	Southwestern Louisiana Institute	Edwin L. Stephens
Natchitoches	Louisiana State Normal College	W. W. Tison
New Orleans	Dillard University	W. W. Alexander, Acting
New Orleans	Loyola University	John W. Hynes
New Orleans	Newcomb College	Pierce Butler
New Orleans	New Orleans University	O. E. Kriege
New Orleans	Straight College	Charles B. Austin
New Orleans	Tulane University of Louisiana	A. B. Dinwiddie
Pineville	Louisiana College	Claybrook Cottingham
Ruston	Louisiana Polytechnic Institute	G. W. Bond
Shreveport	Centenary College of Louisiana	George S. Sexton
Maine		
Brunswick	Bowdoin College	Kenneth C. M. Sills
Castine	Eastern State Normal School	William D. Hall
Farmington	State Normal School	Wilbert G. Mallett
Fort Kent	Madawaska Training School	Richard F. Crocker*
Gorham	State Normal School	Walter E. Russell
Lewiston	Bates College	Clifton D. Gray
Machias	Washington State Normal School	Philip H. Kimball *
Orono	University of Maine	H. S. Boardman
Presque Isle	Aroostock State Normal School	San L. Merriman
Van Buren	St. Mary's College	Daniel F. Sullivan
Waterville	Colby College	Frank W. Johnson
Maryland		
Annapolis	St. John's College	D. H. Gordon
Annapolis	United States Naval Academy	T. C. Hart, Supt.
Baltimore	College of Notre Dame of Maryland	Sister M. Ethelbert
Baltimore	Goucher College	David A. Robertson
Baltimore	Johns Hopkins University	Joseph S. Ames
Baltimore	Loyola College	Henri J. Wiesel
Baltimore	Milton University	Wm. Jas. Heaps
Baltimore	Morgan College	John O. Spencer
Bowie	Maryland Normal School	L. S. James
Chestertown	Washington College	Paul E. Titsworth
College Park	University of Maryland	R. A. Pearson
Emmitsburg	Mount St. Mary's College	Bernard J. Bradley
Emmitsburg	St. Joseph's College	Sister Paula Dunn
Frederick	Hood College	Joseph H. Apple
Frostburg	State Normal School	John L. Dunkle *
Lutherville	Maryland College for Women	George A. Steele
Salisbury	Maryland State Normal School	Wm. J. Holloway
Towson	Maryland State Normal School	Lida Lee Tall
Westminster	Western Maryland College	Albert N. Ward

City	Institution	President
Massachusetts		
Amherst	Amherst College	Stanley King
Amherst	Massachusetts State College	.....
Boston	Boston University	Daniel L. Marsh
Boston	Emmanuel College	Sister Julie
Boston	Northeastern University	Frank P. Speare
Boston	Simmons College	Henry Lefavour
Boston	Teachers College of the City of Boston	Wm. H. J. Kennedy
Bridgewater	State Teachers College	Arthur C. Boyden
Cambridge	Harvard University	A. Lawrence Lowell
Cambridge	Massachusetts Institute of Technology	Karl T. Compton
Cambridge	Radcliffe College	Ada L. Comstock
Chestnut Hill	Boston College	L. J. Gallagher
Fitchburg	State Teachers College	Charles M. Herlihy
Framingham	State Teachers College	Francis A. Bagnall
Hyannis	State Teachers College	Herbert H. Howes
Lowell	Lowell Textile Institute	Charles H. Eames
Lowell	St. Joseph's College	Bro. Priscillianus
Lowell	State Teachers College	Clarence M. Weed
North Adams	State Teachers College	Roy Leon Smith
Northampton	Smith College	William A. Neilson
Norton	Wheaton College	John Edgar Park
Salem	State Teachers College	J. Asbury Pitman
South Hadley	Mount Holyoke College	Mary E. Woolley
Springfield	American International College and Academy	C. S. McGown
Springfield	International Y. M. C. A. College	L. L. Doggett
Tufts College.	Tufts College	John A. Cousens
Wellesley	Wellesley College	Ellen F. Pendleton
Westfield	State Teachers College	Charles Russell
Williamstown	Williams College	Harry A. Garfield
Worcester	Clark University	Wallace W. Atwood
Worcester	College of the Holy Cross	John M. Fox
Worcester	State Teachers College	Wm. B. Aspinwall
Worcester	Worcester Polytechnic Institute	Ralph Earle
Michigan		
Adrian	Adrian College	Harlan L. Feeman
Albion	Albion College	John L. Seaton
Alma	Alma College	Harry M. Crooks
Ann Arbor	University of Michigan	Alex. G. Ruthven
Battle Creek	Battle Creek College	Paul F. Voelker
Berrien Spgs.	Emmanuel Missionary College	Lynn H. Wood
Big Rapids	Ferris Institute	E. M. Clark
Detroit	College of the City of Detroit	Wilford L. Coffey
Detroit	Detroit Teachers College	W. E. Lessenger, Dean
Detroit	Marygrove College	George H. Derry
Detroit	University of Detroit	A. H. Poetker
East Lansing	Michigan State College of Agriculture and Applied Science	Robert S. Shaw
Grand Rapids	Calvin College	R. B. Kuiper
Hillsdale	Hillsdale College	C. L. Herron, Act.
Holland	Hope College	Wynand Wichers
Houghton	Michigan College of Mining and Technology	Wm. O. Hotchkiss
Kalamazoo	Kalamazoo College	Allan Hoben
Kalamazoo	Western State Teachers College	D. B. Waldo
Marquette	Northern State Teachers College	J. M. Munson
Mt. Pleasant	Central State Teachers College	E. C. Warriner
Nazareth	Nazareth College	Mother M. Agatha Ganley
Olivet	Olivet College	James King
Ypsilanti	Michigan State Normal College	Charles McKenny
Minnesota		
Bemidji	State Teachers College	M. W. Deputy
Collegeville	St. John's University	Alcuin Deutsch
Duluth	State Teachers College	E. W. Bohannon
Madison	Lutheran Normal School	A. K. Feroe
Mankato	State Teachers College	Frank D. McElroy
Minneapolis	Augsburg Seminary & College	George Sverdrup
Minneapolis	University of Minnesota	Lotus D. Coffman
Moorhead	Concordia College	J. N. Brown
Moorhead	State Teachers College	R. B. MacLean
New Ulm	Dr. Martin Luther College	E. R. Bliefernicht
Northfield	Carleton College	Donald J. Cowling
Northfield	St. Olaf College	L. W. Boe
St. Cloud	State Teachers College	George A. Selke
St. Paul	Bethel Institute	G. A. Hagstrom
St. Paul	College of St. Catherine	Sister Antonia
St. Paul	College of St. Thomas	M. Schumacher
St. Paul	Hamline University	H. L. Osborn, Acting
St. Paul	Macalester College	John C. Acheson
St. Peter	Gustavus Adolphus College	O. J. Johnson
Winona	College of St. Teresa	Sister Mary A. Molloy

City	Institution	President
Winona	St. Mary's College	John H. Peschges
Winona	State Teachers College	Guy E. Maxwell
Mississippi		
Alcorn	Agricultural & Mechanical College	L. J. Rowan
Blue Mountain	Blue Mountain College	Lawrence T. Lowrey
Cleveland	Delta State Teachers College	W. M. Kethly
Clinton	Mississippi College	D. M. Nelson
Columbus	Mississippi State College for Women	R. E. L. Sutherland
Grenada	Grenada College	D. M. Key
Hattiesburg	Mississippi Woman's College	W. E. Holcomb
Hattiesburg	State Teachers College	Claude Bennett
Holly Springs	Rust College	L. M. McCoy
Jackson	Belhaven College	G. T. Gillespie
Jackson	Jackson College	B. Baldwin Dansby
Jackson	Millsaps College	D. M. Key
Newton	Clark College	A. A. Roebuck
State College	Mississippi State College	Hugh Critz
Tougaloo	Tougaloo College	Wm. T. Holmes
University	University of Mississippi	Joseph N. Powers
Missouri		
Canton	Culver Stockton College	John H. Wood
Cape Girardeau	Southeast Missouri State Teachers College	Joseph A. Serena
Columbia	University of Missouri	Walter Williams
Conception	Conception College	Philip Ruggle
Fayette	Central College	Robert H. Ruff
Fulton	Westminster College	M. E. Melvin
Jefferson City	Lincoln University	C. W. Florence
Kansas City	Rockhurst College	Wm. P. Manion
Kansas City	Teachers College of Kansas City	G. W. Diemer
Kirksville	Northeast Missouri State Teachers College	Eugene Fair
Liberty	William Jewell College	John F. Herget
Marshall	Missouri Valley College	George H. Mack
Maryville	Northwest Missouri State Teachers College	Uel W. Lamkin
Parkville	Park College	F. W. Hawley
St. Charles	Lindenwood College	John L. Roemer
St. Louis	Harris Teachers College	J. Leslie Purdom
St. Louis	Maryville College	Mother Mary Gilmore
St. Louis	St. Louis University	Robert S. Johnston, Chancellor
St. Louis	Stowe College	J. Leslie Purdom
St. Louis	Washington University	George R. Throop
Springfield	Drury College	T. W. Nadal
Springfield	Southwest Missouri State Teachers College	Roy Ellis
Tarkio	Tarkio College	M. E. Collins, Act.
Warrensburg	Central Missouri State Teachers College	E. L. Hendricks
Warrenton	Central Wesleyan College	Ira N. Chiles
Webster Groves	Webster College	George F. Donovan
Montana		
Billings	Eastern Montana Normal School, University of Montana	L. B. McMullen
Bozeman	Montana State College of Agriculture & Mechanic Arts	Alfred A. Atkinson
Butte	Montana School of Mines	Francis A. Thomson
Dillon	Montana State Normal College	Sheldon E. Davis
Helena	Intermountain Union College	Wendell S. Brooks
Helena	Mount St. Charles College	Norbert C. Hoff
Missoula	State University of Montana	Charles H. Clapp
Nebraska		
Blair	Dana College	Erland Nelson
Central City	Nebraska Central College	O. W. Carrell
Chadron	Nebraska State Normal College	Robert I. Elliott
Crete	Doane College	Edwin B. Dean
Fremont	Midland College and Western Theological Seminary	H. F. Martin
Grand Island	Grand Island College	George Sutherland, Acting
Hastings	Hastings College	Calvin H. French
Kearney	Nebraska State Teachers College	George E. Martin
Lincoln	Cotner College	L. C. Anderson
Lincoln	Nebraska Wesleyan University	E. Guy Cutshall
Lincoln	Union College	M. L. Andreasen
Lincoln	University of Nebraska	E. A. Burnett, Chancellor
Omaha	College of St. Mary	Sister M. Leo
Omaha	Creighton University	Patrick J. Mahan
Omaha	Municipal University of Omaha	Wm. E. Sealock
Peru	Peru State Teachers College	W. R. Pate
Wayne	Nebraska State Teachers College	U. S. Conn
York	York College	J. R. Overmiller

City	Institution	President
Nevada		
Reno	University of Nevada	Walter E. Clark
New Hampshire		
Durham	University of New Hampshire	Edward M. Lewis
Hanover	Dartmouth College	Ernest M. Hopkins
Keene	Keene Normal School	Wallace E. Mason
Manchester	St. Anselm's College	Bertrand C. Dolan
Plymouth	Plymouth Normal School	Ernest L. Silver
New Jersey		
Convent Station	College of St. Elizabeth	Sister Marie Jose Byrne, Dean
East Orange	Panzer College of Physical Education and Hygiene	Henry Panzer
East Orange	Upsala College	Carl G. Erickson
Glassboro	New Jersey State Normal School	S. G. Winans
Hoboken	Stevens Institute of Technology	Harvey N. Davis
Jersey City	St. Peter's College	Joseph S. Dinneen
Jersey City	State Normal School at Jersey City	W. Allen Messler *
Lakewood	Georgian Court College	Mother M. Cecelia Scully
Madison	Drew University	Arlo Ayres Brown
Montclair	New Jersey State Teachers College	Harry A. Sprague
Newark	Newark College of Engineering	Allan R. Cullimore
Newark	New Jersey State Normal School	M. Ernest Townsend
New Brunswick	New Jersey State College for Women	Mabel S. Douglass, Dean
New Brunswick	Rutgers University	Robert C. Clothier
Paterson	New Jersey State Normal School	Roy L. Shaffer
Princeton	Princeton University	E. D. Duffield, Act.
Princeton	St. Joseph College	Joseph S. Dunn
South Orange	Seton Hall College	T. H. McLaughlin
Trenton	State Teachers College & Normal School	Roscoe L. West
Zarephath	Alma White College	Arthur K. White
New Mexico		
Albuquerque	University of New Mexico	J. F. Zimmerman
E. Las Vegas	New Mexico Normal University	H. C. Gossard
El Rito	Spanish-American Normal School	John V. Conway
Silver City	New Mexico State Teachers College	A. O. Bowden
Socorro	New Mexico School of Mines	E. H. Wells
State College	New Mexico College of Agriculture & Mechanic Arts	H. L. Kent
New York		
Albany	College of St. Rose	Edmund F. Gibbons
Albany	State College for Teachers	A. R. Brubacher
Alfred	Alfred University	.....
Annandale-on-Hudson	St. Stephen's College, Columbia University	Bernard I. Bell, Warden
Aurora	Wells College	Kerr D. Macmillan
Barrytown	St. Joseph's Normal Institute	.....
Brockport	State Normal School	Alfred C. Thompson
Brooklyn	Brooklyn College	William A. Boylan
Brooklyn	Long Island University	Tristram W. Metcalfe, Acting Comptroller
Brooklyn	Maxwell Teachers Training College	Frederick L. Holtz*
Brooklyn	Polytechnic Institute of Brooklyn	.....
Brooklyn	Saint Francis College	Brother Columba
Brooklyn	St. John's College	Thomas F. Ryan
Brooklyn	St. Joseph's College for Women	Thomas E. Molloy
Buffalo	Canisius College	R. J. Eichhorn
Buffalo	D'Youville College	Mother Saint Edward
Buffalo	State Teachers College	Harry W. Rockwell
Buffalo	The University of Buffalo	Samuel Paul Capen
Canton	St. Lawrence University	Richard E. Sykes
Clinton	Hamilton College	Frederick C. Ferry
Cortland	State Normal School	H. DeW. DeGroat *
Elmira	Elmira College	Frederick Lent
Fredonia	State Normal School	L. R. Gregory *
Garden City	Adelphi College	Frank D. Blodgett
Geneseo	State Normal School	W. A. Holcomb *
Geneva	Hobart College	Murray Bartlett
Hamilton	Colgate University	George B. Cutten
Houghton	Houghton College	James S. Luckey
Ithaca	Cornell University	Livingston Farrand
Ithaca	Ithaca College	George C. Williams
Jamaica	Jamaica Teachers Training College	M. E. Rogalin *
Keuka Park	Keuka College	A. H. Norton
New Paltz	State Normal School	L. H. van den Berg
New Rochelle	College of New Rochelle	John P. Chidwick

City	Institution	President
New York ...	Barnard College	V. C. Gildersleeve, Dean
New York ...	College of the City of New York	F. B. Robinson
New York ...	College of Mount St. Vincent	Cardinal Hayes
New York ...	College of The Sacred Heart	Mother Grace C. Dammann
New York ...	Columbia University	Nicholas M. Butler
New York ...	Fordham University	Aloysius J. Hogan
New York ...	Hunter College of the City of N. Y.	James M. Kieran
New York ...	Manhattan College	Brother Cornelius .....
New York ...	New York University	.....
New York ...	Teachers College, Columbia University	Wm. F. Russell, Dean
Niagara Univ.	Niagara University	John J. O'Byrne
Oneonta	Hartwick College	Chas. W. Leitzell
Oneonta	State Normal School	Percy I. Bugbee *
Oswego	State Normal School	James G. Riggs *
Plattsburgh ..	State Normal School	George K. Hawkins
Potsdam	Clarkson College of Technology	.....
Potsdam	State Normal School	R. T. Congdon *
Poughkeepsie	Vassar College	H. N. MacCracken
Rochester	Nazareth College	Sister Teresa Marie, Acting
Rochester	Rochester City Normal School	Edward J. Bonner*
Rochester	University of Rochester	Rush Rhees
St. Bonaventure	St. Bonaventure's College	Thomas Plassmann
Saratoga Spgs.	Skidmore College	Henry T. Moore
Schenectady .	Union University	Frank P. Day, Chancellor
Staten Island.	Wagner College	Herman Brezing
Syracuse	New York State College of Forestry	Hugh P. Baker, Dean
Syracuse	Syracuse City Normal School	Wm. W. Wright *
Syracuse	Syracuse University	C. Wesley Flint *
Tarrytown ...	Marymount College	Mother M. Gerard
Troy	Rensselaer Polytechnic Institute	Palmer C. Ricketts
Troy	Russell Sage College	J. L. Meader
West Point ..	United States Military Academy	W. D. Connor, Supt.
White Plains .	Good Counsel College	Mother M. Aloysia
North Carolina		
Asheville	Asheville Normal & Teachers College	John E. Calfee
Belmont	Belmont Abbey Seminary	Thomas Oestereich
Boone	Appalachian State Teachers College	B. B. Dougherty
Chapel Hill ..	University of North Carolina	Frank P. Graham
Charlotte	Johnson C. Smith University	H. L. McCrorey
Charlotte	Queens Chicora College	W. H. Frazer
Conover	Concordia College	H. B. Hemmeter
Cullowhee ...	Western Carolina Teachers College	H. T. Hunter
Davidson	Davidson College	Walter L. Lingle
Durham	Duke University	Wm. Preston Few
Durham	North Carolina College for Negroes	James E. Shepard
Elizabeth City,	State Normal School	J. H. Bias
Elon College .	Elon College	Leon E. Smith
Fayetteville .	State Normal School	E. E. Smith
Greensboro ..	Bennett College for Women	David D. Jones
Greensboro ...	Greensboro College	S. B. Turrentine
Greensboro ...	North Carolina College for Women	Julius I. Foust
Greenville	East Carolina Teachers College	Robert H. Wright
Guilford College	Guilford College	Raymond Binford
Hickory	Lenoir Rhyne College	H. B. Schaefer
High Point ..	High Point College	G. I. Humphreys
Kittrell	Kittrell College	D. K. Cherry
Murfreesboro .	Chowan College	W. B. Edwards
Raleigh	Meredith College	Charles E. Brewer
Raleigh	North Carolina State College of Agriculture & Engineering	Eugene C. Brooks
Raleigh	Shaw University	Wm. Stuart Nelson
Red Springs ..	Flora MacDonald College	Henry G. Bedinger
Salisbury	Catawba College	Howard R. Omwake
Salisbury	Livingstone College	W. J. Trent
Wake Forest .	Wake Forest	Thurman D. Kitchin
Wilson	Atlantic Christian College	H. S. Hilley
Winston-Salem	Salem College	H. F. Rondthaler
Winston-Salem	Winston-Salem Teachers College	S. G. Atkins
North Dakota		
Dickinson ...	State Normal School	C. L. Kjerstad
Ellendale	State Normal & Industrial School	R. M. Black
Fargo	North Dakota Agricultural College	John H. Sheppard
Grand Forks .	Wesley College	Charles L. Wallace
Jamestown ...	Jamestown College	B. H. Kroeze
Mayville	State Teachers College	Carl C. Swain
Minot	State Teachers College	G. A. McFarland
University ...	University of North Dakota	Thomas F. Kane
Valley City ..	State Teachers College	C. E. Allen
Ohio		
Ada	Ohio Northern University	Robert Williams
Akron	University of Akron	George F. Zook
Alliance	Mount Union College	Wm. H. McMaster
Ashland	Ashland College	Edwin E. Jacobs
Athens	Ohio University	Elmer B. Bryan
Berea	Baldwin-Wallace College	Albert B. Storms
Bluffton	Bluffton College	Samuel K. Mosiman
Bowling Green	Bowling Green State College	H. B. Williams
Cedarville ...	Cedarville College	W. R. McChesney
Cincinnati ...	College of the Sacred Heart	Mother Frances Sullivan
Cincinnati ...	University of Cincinnati	Raymond Walters
Cincinnati ...	Xavier University	Hugo F. Sloctemyer
Cleveland ...	John Carroll University	B. J. Rodman
Cleveland ...	Case School of Applied Science	Wm. E. Wickenden
Cleveland ...	School of Education, Western Reserve University	Charles W. Hunt
Cleveland ...	Ursuline College	Mother M. Veronica
Cleveland ...	Western Reserve University	Robert E. Vinson
Columbus	Capital University	Otto Mees
Columbus	Columbus Normal School	Vance M. Smith *
Columbus	Ohio State University	G. W. Rightmire
Dayton	University of Dayton	Bernard P. O'Reilly
Defiance	Defiance College	.....
Delaware	Ohio Wesleyan University	Edmund D. Soper
East Columbus	St. Mary's of the Spring College	Sister Adele
Findlay	Findlay College	H. R. Dunathan
Gambier	Kenyon College	Wm. F. Peirce
Granville	Denison University	A. A. Shaw
Hiram	Hiram College	Kenneth I. Brown
Kent	Kent State College	J. O. Engleman
Marietta	Marietta College	Edward S. Parsons
Mount St. Joseph	Mount St. Joseph College	Mother Irenaea
New Concord .	Muskingum College	R. N. Montgomery
Oberlin	Oberlin College	Ernest H. Wilkins
Oxford	Miami University	Alfred H. Upham
Oxford	Western College	Ralph K. Hickok
Painesville ...	Lake Erie College	Vivian B. Small
South Euclid .	Notre Dame College	Mother Mary Evarista
Springfield ...	Wittenberg College	Rees Edgar Tulloss
Tiffin	Heidelberg College	Charles E. Miller
Toledo	St. John's College	G. A. Fitzgibbons
Toledo	University of the City of Toledo	Henry J. Doermann
Westerville ..	Otterbein College	W. G. Clippinger
Wilberforce .	Wilberforce University	Charles H. Wesley
Wilmington ..	Wilmington College	Walter L. Collins
Wooster	The College of Wooster	Charles F. Wishart
Yellow Springs	Antioch College	Arthur E. Morgan
Oklahoma		
Ada	East Central State Teachers College	A. Linscheid
Alva	Northwestern State Teachers College	W. W. Parker
Bethany	Bethany-Peniel College	A. K. Bracken
Chickasha ...	Oklahoma College for Women	M. A. Nash
Durant	Southwestern Teachers College	Eugene S. Briggs
Edmond	Central State Teachers College	M. A. Beeson
Enid	Phillips University	I. N. McCash
Goodwell	Panhandle Agricultural & Mechanical College	A. W. Fanning
Guthrie	Catholic College of Oklahoma for Women	Mother Mary Agnes Arvin
Langston	Colored Agricultural & Normal University	Z. T. Hubert
Norman	University of Oklahoma	Wm. B. Bizzell
Oklahoma City	Oklahoma City University	Eugene M. Antrim
Shawnee	Oklahoma Baptist University	Wm. C. Boone
Stillwater	Oklahoma Agricultural & Mechanical College	Henry G. Bennett
Tahlequah ...	Northeastern State Teachers College	M. P. Hammond
Tulsa	University of Tulsa	John D. Finlayson
Weatherford ..	Southwestern State Teachers College	E. E. Brown
Wilburton ...	Eastern Oklahoma College	E. E. Tourtellotte

City	Institution	President
Oregon		
Albany	Albany College	Thomas W. Bibb
Ashland	Southern Oregon State Normal School	.....
Corvallis	Oregon State Agricultural College	Wm. J. Kerr
Eugene	University of Oregon	Arnold B. Hall
Forest Grove	Pacific University	John F. Dobbs
La Grande	Eastern Oregon Normal School	H. E. Inlow
McMinnville	Linfield College	Elam A. Anderson
Monmouth	Oregon Normal School	J. A. Churchill
Newberg	Pacific College	Levi T. Pennington
Portland	Reed College	.....
Salem	Willamette University	Carl G. Doney
Pennsylvania		
Allentown	Cedar Crest College	Wm. F. Curtis
Allentown	Muhlenberg College	John A. W. Haas
Annville	Lebanon Valley College	J. R. Engle, Acting
Beaver Falls	Geneva College	M. M. Pearce
Bethlehem	Lehigh University	Chas. R. Richards
Bethlehem	Moravian College	Wm. N. Schwarze
Bethlehem	Moravian College for Women	Edwin J. Heath
Bloomsburg	State Teachers College	Francis B. Haas
Bryn Athyn	Academy of the New Church	N. D. Pendleton
Bryn Mawr	Bryn Mawr College	Marion E. Park
California	State Teachers College	Robert M. Steele
Carlisle	Dickinson College	Karl T. Waugh
Chambersburg	Wilson College	E. D. Warfield
Chester	Pennsylvania Military College	Frank K. Hyatt
Chestnut Hill	Mount St. Joseph College	Mother Mary James
Cheyney	Cheyney Training School for Teachers	L. P. Hill
Clarion	State Teachers College	G. C. L. Riemer
Collegeville	Ursinus College	George L. Omwake
Dallas	College Misericordia	Sister Mary Loretta
Easton	Lafayette College	Wm. Mather Lewis
East Stroudsburg	State Teachers College	T. T. Allen
Edinboro	State Teachers College	C. C. Crawford
Elizabethtown	Elizabethtown College	Ralph W. Schlosser
Erie	Villa Maria College	.....
Gettysburg	Gettysburg	H. W. A. Hanson
Greensburg	Seton Hill College	J. A. W. Reeves
Greenville	Thiel College	E. Clyde Xander
Grove City	Grove City College	Weir C. Ketler
Haverford	Haverford College	W. W. Comfort
Huntingdon	Juniata College	Charles C. Ellis
Immaculata	Immaculata College	Anthony J. Flynn
Indiana	State Teachers College	C. R. Foster
Jenkintown	Beaver College	W. B. Greenway
Kutztown	State Teachers College	A. C. Rothermel
Lancaster	Franklin & Marshall College	Henry H. Apple
Latrobe	St. Vincent College	Alfred Koch
Lewisburg	Bucknell University	Homer P. Rainey
Lincoln Univ.	Lincoln University	Wm. H. Johnson
Lock Haven	State Teachers College	D. W. Armstrong
Loretto	St. Francis College	P. J. Sullivan, Acting
Mansfield	State Teachers College	W. R. Straughn
Meadville	Allegheny College	Wm. P. Tolley
Millersville	State Teachers College	Landis Tanger
New Wilmington	Westminster College	Robert F. Galbreath
Philadelphia	Drexel Institute	Parke R. Kolbe
Philadelphia	Dropsie College	Cyrus Adler
Philadelphia	La Salle College	Brother E. Alfred
Philadelphia	St. Joseph's College	Wm. T. Tallon
Philadelphia	Temple University	Charles E. Beury
Philadelphia	University of Pennsylvania	Thomas S. Gates
Pittsburgh	Carnegie Institute of Technology	Thomas S. Baker
Pittsburgh	Duquesne University of the Holy Ghost	J. J. Callahan
Pittsburgh	H. C. Frick Training School for Teachers	H. L. Spencer *
Pittsburgh	Pennsylvania College for Women	Cora H. Coolidge
Pittsburgh	University of Pittsburgh	John G. Bowman, Chancellor
Reading	Albright College	.....
Rosemont	Rosemont College	Mother Mary Ignatius
Scranton	Marywood College	Mother M. Josepha Hurley
Scranton	St. Thomas College	Brother D. Edward
Selinsgrove	Susquehanna University	G. Morris Smith
Shippensburg	State Teachers College	A. L. Rowland
Slippery Rock	State Teachers College	J. L. Eisenberg
State College	Pennsylvania State College	Ralph D. Hetzel
Swarthmore	Swarthmore College	Frank Aydelotte
Villanova	Villanova College	E. V. Stamford
Washington	Washington & Jefferson College	Ralph Cooper Hutchison
Waynesburg	Waynesburg College	Paul R. Stewart
West Chester	State Teachers College	N. W. Cameron
Rhode Island		
Kingston	Rhode Island State College	Ray. G. Bressler
Providence	Brown University	C. A. Barbour
Providence	Providence College	L. C. McCarthy
Providence	Rhode Island College of Education	John L. Alger
South Carolina		
Anderson	Anderson College	Annie D. Denmark
Charleston	The Citadel—The Military College of South Carolina	Chas. P. Summerall
Charleston	College of Charleston	Harris Randolph
Clemson College	Clemson Agricultural College	Enoch W. Sikes
Clinton	Presbyterian College	John McSween
Columbia	Allen University	D. H. Sims
Columbia	Benedict College	J. J. Starke
Columbia	Columbia College	J. Caldwell Guilds
Columbia	University of South Carolina	L. T. Baker
Due West	Erskine College	Robert C. Grier
Gaffney	Limestone College	R. C. Granberry
Greenville	Furman University	W. J. McGlothlin
Greenville	Greenville Woman's College	H. W. Provence
Greenwood	Lander College	J. W. Speake
Hartsville	Coker College	Carlyle Campbell
Newberry	Newberry College	James C. Kinard
Orangeburg	Cliflin College	J. B. Randolph
Orangeburg	State Agricultural and Mechanical College	M. F. Whittaker
Rock Hill	Winthrop College	J. Pinckney Kinard
Spartanburg	Converse College	Robert P. Pell
Spartanburg	Wofford College	Henry N. Snyder
South Dakota		
Aberdeen	Northern Normal & Industrial School	D. A. Anderson
Brookings	South Dakota State College of Agriculture & Mechanic Arts	C. W. Pugsley
Huron	Huron College	Royal Clyde Agne
Madison	Eastern State Normal School	E. A. Bixler, Acting
Mitchell	Dakota Wesleyan University	Earl A. Roadman
Rapid City	State School of Mines	C. C. O'Harra
Sioux Falls	Augustana College	O. J. H. Preus
Sioux Falls	Sioux Falls College	C. R. Sattgast
Spearfish	Spearfish Normal School	E. C. Woodburn
Springfield	Southern State Normal School	C. G. Lawrence
Vermilion	University of South Dakota	Herman G. James
Yankton	Yankton College	G. W. Nash
Tennessee		
Bristol	King College	Charles W. Henry
Chattanooga	University of Chattanooga	Alexander Guerry
Clarksville	Austin Peay Normal School	P. P. Claxton
Cookeville	Tennessee Polytechnic Institute	Q. M. Smith
Greenville	Tusculum College	C. A. Anderson
Harrogate	Lincoln Memorial University	S. W. McClelland
Jackson	Lambuth College	Richard E. Womack
Jackson	Lane College	J. F. Lane
Jackson	Union University	John J. Hurt
Jefferson City	Carson-Newman College	James T. Warren
Johnson City	State Teachers College	C. C. Sherrod
Knoxville	Knoxville College	J. Kelly Giffen
Knoxville	The University of Tennessee	H. A. Morgan
Lebanon	Cumberland University	Ernest L. Stockton
McKenzie	Bethell College	Edgar H. Guynn
Madison	Nashville Agricultural Normal Institute	Edw. A. Sutherland
Maryville	Maryville College	Ralph Waldo Lloyd
Memphis	Roger Williams College	A. McE. Williams
Memphis	Southwestern	Charles E. Diehl
Memphis	State Teachers College	J. W. Brister
Milligan College	Milligan College	H. J. Derthick
Murfreesboro	State Teachers College	P. A. Lyon
Murfreesboro	Tennessee College for Women	E. L. Atwood
Nashville	Fisk University	Thomas E. Jones
Nashville	George Teabody College for Teachers	Bruce R. Payne
Nashville	Tennessee Agricultural & Industrial State Teachers College	W. J. Hale
Nashville	Trevecca College	C. E. Hardy
Nashville	Vanderbilt University	James H. Kirkland

City	Institution	President
Rogersville ..	Swift Memorial College	C. E. Tucker
Sewanee	University of the South	Benj. F. Finney
Texas		
Abilene	Abilene Christian College	Batsell Baxter
Abilene	McMurry College	J. W. Hunt
Abilene	Simmons University	J. D. Sandefer
Alpine	Sul Ross State Teachers College	H. W. Morelock
Austin	St. Edward's University	Hugh O'Donnell
Austin	Tillotson College	Mary E. Branch
Austin	The University of Texas	H. Y. Benedict
Belton	Baylor College for Women	J. C. Hardy
Brownwood ..	Daniel Baker College	S. E. Chandler
Brownwood ..	Howard Payne College	Thomas H. Taylor
Canyon	West Texas State Teachers College	J. A. Hill
College Station	Agricultural & Mechanical College of Texas	T. O. Walton
Commerce ...	East Texas State Teachers College	Sam H. Whitley
Dallas	Southern Methodist University	Chas. C. Selecman
Denton	North Texas State Teachers College	R. L. Marquis
Denton	Texas State College for Women, College of Industrial Arts	Louis H. Hubbard
Fort Worth ..	Texas Christian University	Edward McS. Waits
Fort Worth ..	Texas Woman's College	Tom W. Brabham
Georgetown ..	Southwestern University	King Vivion
Houston	The Rice Institute	Edgar Odell Lovett
Houston	St. Thomas College	T. P. O'Rourke
Huntsville ...	Sam Houston State Teachers College	H. F. Estill
Kingsville	Texas College of Arts & Industries	John L. Nierman, Acting
Lubbock	Texas Technological College	.....
Marshall	Bishop College	Joseph J. Rhoads
Marshall	Wiley College	M. W. Dogan
Nacogdoches .	Stephen F. Austin State Teachers College	A. W. Birdwell
Prairie View.	Prairie View State Industrial College	W. R. Banks *
San Antonio ..	Incarnate Word College	Sister M. Columkille
San Antonio ..	Our Lady of the Lake College	H. A. Constantineau
San Antonio ..	St. Mary's University	Alfred H. Rabe
San Marcos ..	Southwest Texas State Teachers College	C. E. Evans
Seguin	Guadalupe College	J. R. Lockett
Sherman	Austin College	Everett B. Tucker
Waco	Baylor University	Pat Neff
Waxahachie ..	Trinity University	John H. Burma
Utah		
Logan	Utah State Agricultural College	Elmer G. Peterson
Provo	Brigham Young University	Franklin S. Harris
Salt Lake City	University of Utah	George Thomas
Vermont		
Burlington ...	University of Vermont & State Agricultural College	Guy W. Bailey
Castleton	State Normal School	C. S. Woodruff *
Johnson	State Normal School	Ralph C. Jenkins
Middlebury ..	Middlebury College	Paul D. Moody
Northfield	Norwich University	Chas. A. Plumley
Winooski	St. Michael's College	Eugene Alliott
Virginia		
Ashland	Randolph Macon College	Rob't E. Blackwell
Blacksburg ...	Virginia Polytechnic Institute	Julian A. Burruss
Bridgewater ..	Bridgewater College	Paul H. Bowman
Charlotteville	University of Virginia	John Lloyd Newcomb, Acting
East Radford.	State Teachers College	John P. McConnell
Emory	Emory & Henry College	J. N. Hillman
Ettrick	Virginia State College	John M. Gandy
Farmville ...	State Teachers College	J. L. Jarman
Fredericksburg	State Teachers College	Morgan L. Combs
Hampden-Sydney	Hampden-Sydney College	J. D. Eggleston
Hampton	Hampton Institute	Arthur Howe
Harrisonburg .	State Teachers College	S. P. Duke
Hollins	Hollins College	Matty L. Cocke
Lexington	Virginia Military Institute	J. A. Lejeune, Supt.
Lexington	Washington & Lee University	Francis P. Gaines
Lynchburg ...	Lynchburg College	J. T. T. Hundley
Lynchburg ...	Randolph Macon Woman's College	N. A. Patillo, Acting
Lynchburg ...	Virginia Theological Seminary and College	Vernon Johns
Petersburg ...	Virginia State College for Negroes	John M. Gandy
Richmond	Richmond Normal School	W. D. Ellis
Richmond	University of Richmond	F. W. Boatwright
Richmond	Virginia Union University	William J. Clark
Salem	Roanoke College	Chas. J. Smith
Staunton	Mary Baldwin College	L. Wilson Jarman
Sweet Briar ..	Sweet Briar College	Meta Glass
Williamsburg	College of William & Mary	J. A. C. Chandler
Washington		
Bellingham ..	State Normal School	C. H. Fisher
Cheney	State Normal School	R. T. Hargreaves
College Place	Walla Walla College	John E. Weaver
Ellensburg ...	Washington State Normal School	Rob't E. McConnell
Pullman	State College of Washington	Ernest O. Holland
Seattle	Seattle Pacific College	Charles H. Watson
Seattle	University of Washington	Matthew L. Spencer
Spokane	Gonzaga University	John J. Keep
Spokane	Spokane University	A. G. Sater, Acting
Spokane	Whitworth College	Ward W. Sullivan
Tacoma	College of Puget Sound	Edward H. Todd
Walla Walla .	Whitman College	S. B. L. Penrose
West Virginia		
Athens	Concord State Teachers College	J. Frank Marsh
Barboursville .	Morris Harvey College	Leonard Riggleman
Bethany	Bethany College	Cloyd Goodnight
Bluefield	Bluefield State Teachers College	R. P. Sims
Buckhannon ..	West Virginia Wesleyan College	Roy McCuskey
Elkins	Davis & Elkins College	James E. Allen
Fairmont	Fairmont State Teachers College	Joseph Rosier
Glenville	Glenville State Teachers College	E. G. Rohrbough
Harpers Ferry	Storer College	H. T. McDonald
Huntington ..	Marshall College	M. P. Shawkey
Institute ...	West Virginia State College	John W. Davis
Montgomery .	New River State College	C. H. Martin
Morgantown ..	West Virginia University	John R. Turner
Salem	Salem College	S. Orestes Bond
Shepherdstown	Shepherd College State Normal School	W. H. S. White
West Liberty .	West Liberty State Teachers College	J. S. Bonar
Wisconsin		
Appleton	Lawrence College	Henry M. Wriston
Ashland	Northland College	J. D. Brownell
Beloit	Beloit College	Irving Maurer
Eau Claire ...	State Teachers College	H. A. Schofield
La Crosse ...	State Teachers College	Geo. M. Snodgrass
Madison	University of Wisconsin	Glenn Frank
Menomonie ...	The Stout Institute	Burton E. Nelson
Milton	Milton College	Jay W. Crofoot
Milwaukee ...	Concordia College	G. C. Barth
Milwaukee ...	Marquette University	William M. Magee
Milwaukee ...	Milwaukee-Downer College	Lucia R. Briggs
Milwaukee ...	Mount Mary College	Edw. A. Fitzpatrick
Milwaukee ...	State Teachers College	Frank E. Baker
Nashotah	Nashotah House	E. J. M. Nutter
Oshkosh	State Teachers College	Forrest R. Polk
Platteville ...	State Teachers College	Asa M. Royce
Plymouth	Mission House College	Paul Grosshuesch
Ripon	Ripon College	Silas Evans
River Falls ..	State Teachers College	J. H. Ames
Stevens Point	State Teachers College	Frank S. Hyer
Superior	State Teachers College	Jim Dan Hill
Watertown ...	Northwestern College	Erwin E. Kowalke
Waukesha	Carroll College	Wm. A. Ganfield
Whitewater ..	State Teachers College	C. M. Yoder
Wyoming		
Laramie	University of Wyoming	Arthur G. Crane
Outlying Possessions		
Fairbanks, Alaska	Alaska Agricultural College and School of Mines	Charles E. Bunnell
Honolulu, Hawaii	Teachers College, University of Hawaii	Benjamin O. Wist, Dean
Honolulu, Hawaii	University of Hawaii	David L. Crawford
Manila, P. I. .	Philippine Normal School	R. K. Gilmore *
Manila, P. I. .	University of the Philippines	Rafael Palma
Rio Piedras, Porto Rico .	University of Porto Rico	Carlos E. Chardon

City	Institution	President
Canada		
Antigonish, N. S.	St. Francis Xavier University	H. P. MacPherson
Aurora, Ont.	St. Andrew's College	D. B. MacDonald, Headmaster
Belleville, Ont.	Albert College	Charles W. Bishop *
Charlottetown P. E. I.	St. Dunstan's University	J. A. Murphy
Calgary, Alta.	Mount Royal College	G. W. Kerby *
Edmonton, Alta.	Alberta College	F. S. McCall *
Edmonton, Alta.	University of Alberta	R. C. Wallace
Fredericton, N. B.	University of New Brunswick	C. C. Jones
Halifax, N. S.	Dalhousie University	Carleton Stanley
Halifax, N. S.	Halifax Ladies College and Conservatory of Music	
Halifax, N. S.	University of King's College	A. H. Moore
Hamilton, Ont.	McMaster University	H. P. Whidden, Chancellor
Kingston, Ont.	Queen's University	W. H. Fyfe *
Kitchener, Ont.	St. Jerome's College	Robert S. Dehler
Lennoxville, Que.	University of Bishop's College	A. H. McGreer *
London, Ont.	University of Western Ontario	Wm. Sherwood Fox
Montreal, Que.	Lower Canada College	C. S. Fosbery
Montreal, Que.	Loyola College	Thos. J. MacMahon
Montreal, Que.	McGill University	Edward W. Beatty, Chancellor
Montreal, Que.	Montreal University	A. J. V. Piette *
Ottawa, Ont.	University of Ottawa	G. Marchand
Ottawa, Ont.	Ottawa University Normal School	Rene Lamoureux *
Quebec, Que.	Laval University	P. J. Fillion
Regina, Sask.	Regina College	E. W. Stapleford
Ste. Anne de Bellevue, Que.	MacDonald College	Arthur W. Currie *
St. Joseph, N. B.	St. Joseph's University	H. A. Vanier
St. Thomas Ont.	Alma College	P. S. Dobson *
Saskatoon, Sask.	University of Saskatchewan	W. C. Murray
Stanstead, Que.	Stanstead Wesleyan College	E. C. Amaron *
Toronto, Ont.	Havergal College	Marian Wood *
Toronto, Ont.	University of Toronto	H. J. Cody
Toronto, Ont.	Upper Canada College	W. L. Grant *
Toronto, Ont.	Victoria University	E. W. Wallace
Truro, N. S.	Nova Scotia Agricultural College	J. M. Trueman *
Vancouver, B. C.	University of British Columbia	Leonard S. Klinck
Winnipeg, Man	St. John's College	W. Burman, Headmaster
Winnipeg, Man.	University of Manitoba	James A. MacLean
Winnipeg, Man.	Wesley College	John H. Riddell
Wolfville, N. S.	Arcadia University	F. W. Patterson

* Indicates normal school principals.

ARTICLES IN PREVIOUS EDITIONS OF THE AMERICAN SCHOOL AND UNIVERSITY

Concerning the Planning, Operation and Upkeep of Colleges and Universities

EDITION OF 1931-1932 *

The Expansion of Small Colleges
By Dwight James Baum, Architect

Planning a University from the Operating Point of View
By James M. White, Supervising Architect and Superintendent of Business Operations, University of Illinois

Lighting of College Campuses and Athletic Fields
By F. D. Crowther, Illuminating Engineer, General Electric Co.

A Library Planned from Unit Requirements (Dartmouth College)
By Jens Fredrick Larson, Architect

A Fireproof Dormitory at a Cost of $1,000 per Resident
By Carl Reger, Architect

The Biology Wing of the Biology-Geology Building, University of Rochester
By William Dayton Merrell, Department of Biology, College of Arts and Science, University of Rochester

The Dispensing of Chemicals and Laboratory Apparatus at the University of Michigan
By R. J. Carney, Director of the Chemistry Store and Assistant Professor of Chemistry, University of Michigan

The Kedzie Chemical Laboratory, Michigan State College
By Alex L. Trout, Malcolmson & Higginbotham & Trout, Architects

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By Arthur Hawthorne Carhart, McCrary, Culley & Carhart, Landscape Architects

Organization and Equipment for Upkeep of Buildings and Grounds of a University Campus
By I. W. Truettner, Maintenance Inspector, Buildings and Grounds Department, University of Michigan

Special Features of the Gymnasium and Locker and Dressing-Room Facilities of a New School of Education Building
By Jay B. Nash, Professor of Physical Education and Health, New York University

The Marietta College Field House
By A. H. Savenye, Financial Secretary, Marietta College

Four University Gymnasium Buildings
By Gavin Hadden, C.E.

Douglass Hall, A New Dormitory for Men at the College of Wooster
By D. Everett Waid, Architect

New Dormitory at University of Oregon Pays for Itself
By Karl W. Onthank, Executive Secretary, University of Oregon

Storeroom Keeping for a Department of Chemistry
By Clifford D. Carpenter, Professor of Chemistry, Columbia University

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By W. E. Brockway, Supervising Engineer; and R. W. Lind, Construction Engineer, University of Colorado

Functions and Methods of a University Purchasing Department
By George S. Frank, Manager of Purchases, Cornell University

Factors Which Should Guide the Design of Buildings for Physical Education
By Henry Noble MacCracken, President, Vassar College

The New Gymnasium, Swimming Pool and Indoor Stadium of the University of Pennsylvania
By R. Tait McKenzie, M.D., Director of the Department of Physical Education

The Field House of the University of Minnesota
By F. W. Luehring, Director, Department of Physical Education and Athletics, University of Minnesota

*Copies may be obtained at $2.50 each.

Section X

SUPERINTENDENTS OF SCHOOLS IN PLACES OF 5,000 POPULATION AND OVER

In the following list are included all places which are known to have a superintendent of schools and which, according to the 1930 Federal Census, have a population of 5,000 or over. These include incorporated cities, towns, boroughs and villages, unincorporated towns (in New England), and townships classified as urban by the Bureau of the Census. The names of the superintendents have been revised to April, 1932, and in some cases more recently.

REFERENCES

(a) County superintendent.
(b) Parish superintendent.
(c) Acting.
(d) Division superintendent.

City	Superintendent
Alabama	
Alabama City	George W. Floyd
Andalusia	C. L. Martin
Anniston	S. E. Alverson
Bessemer	J. E. Bryan
Birmingham	C. B. Glenn
Decatur	W. W. Benson
Dothan	C. C. Moseley
Eufaula	T. G. Wilkinson
Fairfield	B. B. Baker
Florence	F. T. Appleby
Gadsden	C. A. Donehoo
Homewood	(No local board of education)
Huntsville	W. G. Hamm
Jasper	W. P. Snuggs
Lanett	C. E. Lunceford
Mobile	W. C. Griggs
Montgomery	W. R. Harrison
Opelika	J. W. Watson
Phenix City	L. P. Stough
Selma	P. M. Munro
Sheffield	L. E. Creel
Talladega	Judson Snead
Tarrant	W. A. Parker
Troy	L. D. Bynum
Tuscaloosa	J. M. Burnett
Arizona	
Bisbee	R. E. Souers
Douglas	J. E. Carlson, Jr.
Globe	F. E. Webb
Miami	C. K. Davis
Nogales	A. J. Mitchell
Phoenix	John D. Loper
Prescott	Edward F. Honn
Tucson	C. E. Rose
Arkansas	
Blytheville	Crawford Greene
Camden	F. W. Whiteside
Conway	W. D. Jeter
El Dorado	Charles E. Dicken
Fayetteville	Frank S. Root
Fort Smith	J. W. Ramsey
Helena	J. F. Wahl
Hope	Miss Beryl Henry
Hot Springs National Park	Harvey H. Haley
Jonesboro	Fred Keller
Little Rock	R. C. Hall
Malvern	J. L. Pratt
No. Little Rock	W. E. Phipps
Paragould	J. Will Pierce
Pine Bluff	J. R. Allen
Russellville	W. S. Williams
Texarkana	P. N. Bragg
Van Buren	D. M. Riggin
California	
Alameda	Wm. G. Paden
Albany	John Franklin West
Alhambra	F. V. Routt
Anaheim	M. A. Gauer
Arcadia	H. F. Aker
Bakersfield	L. E. Chenoweth
Bell	.....
Belvedere	.....
Berkeley	Lewis W. Smith
Beverly Hills	E. J. Hummel
Brawley	G. R. McIntire
Burbank	F. A. Henderson
Burlingame	L. D. Henderson
Calexico	D. P. Choisser
Chico	C. H. Camper
Colton	J. H. Waldron
Compton	J. Wm. Gastrich
Corona	Glen D. Wight
Coronado	F. A. Boyer (Elementary) J. Leslie Cutler (High)
Culver City	Bessie O. Brown
Daly City	R. L. Crane
Downey	Spencer V. Williams (Elementary) F. F. Otto (High)
El Centro	B. M. Gruwell
Eureka	G. B. Albee
Fresno	O. S. Hubbard
Fullerton	R. E. Green
Gardena	.....
Glendale	R. D. White
Hanford	C. E. Denham
Hawthorne	Inez Durnford
Hayward	Robert M. Reid
Huntington Park	C. L. Johns (Elementary) K. L. Stockton (High)
Inglewood	G. W. Crozier
Lodi	W. E. Wiley
Long Beach	H. S. Upjohn
Los Angeles	F. A. Bouelle
Lynwood	Coral F. Mercer
Martinez	Alice E. Kelly
Marysville	W. A. Kynoch (Elementary) Curtis E. Warren (High)
Maywood	.....
Merced	C. S. Clark
Modesto	J. H. Bradley
Monrovia	J. Warren Ayer
Montebello	Mark R. Jacobs
Monterey	J. H. Graves (Elementary) J. R. McKillop (High)
Monterey Park	.....
Napa	E. E. Crawford
National City	B. H. Gibbon
Oakland	W. E. Givens
Ontario	C. W. Randall
Orange	G. C. Sherwood
Oxnard	R. B. Haydock
Pacific Grove	R. H. Down
Palo Alto	A. C. Barker
Pasadena	J. A. Sexson
Petaluma	David M. Durst
Piedmont	Harry W. Jones
Pittsburg	F. S. Ramsdell
Pomona	Emmett Clark
Porterville	C. E. Bigham
Redlands	H. G. Clement
Redondo Beach	E. B. Thomas
Redwood City	John Gill
Richmond	W. T. Helms
Riverside	Ira C. Landis
Roseville	W. T. Eich
Sacramento	C. C. Hughes
Salinas	R. D. Case
San Bernardino	Lewis E. Adams
San Diego	Walter R. Hepner
San Fernando	.....
San Francisco	J. M. Gwinn
San Gabriel	R. B. Walter
San Jose	W. L. Bachrodt
San Leandro	W. O. Davies
San Luis Obispo	Charles E. Teach
San Mateo	George W. Hall (Elementary) Homer Martin (High)
San Rafael	O. R. Hartzell
Santa Ana	.....
Santa Barbara	P. E. Stewart
Santa Clara	C. W. Townsend
Santa Cruz	C. R. Holbrook
Santa Maria	Robert Bruce
Santa Monica	Percy R. Davis
Santa Paula	George A. Bond
Santa Rosa	Jerome O. Cross
South Gate	.....
South Pasadena	George C. Bush
South San Francisco	A. C. Kleemeyer
Stockton	Ansel S. Williams
Torrance	.....
Tulare	S. J. Brainerd
Vallejo	Elmer L. Cave
Ventura	E. L. Van Dellen
Visalia	DeWitt Montgomery
Watsonville	T. S. MacQuiddy
Whittier	S. H. Thompson (Elementary) D. A. Stouffer (High)
Woodland	.....
Colorado	
Alamosa	G. P. Young
Boulder	William V. Casey
Canon City	L. L. Beahm
Colorado Springs	H. M. Corning
Denver	A. L. Threlkeld
Durango	Emory E. Smiley
Englewood	Gary Gordon
Fort Collins	Ward I. Miller
Grand Junction	R. E. Tope
Greeley	I. E. Stutsman
La Junta	Robert M. Tirey

City	Superintendent
Longmont	W. D. Blaine
Loveland	R. W. Truscott
Pueblo	District No. 1, J. H. Risley District No. 20, J. F. Keating
Salida	L. D. Hightower
Sterling	R. R. Knowles
Trinidad	Russell R. Brown
Walsenburg	S. M. Andrews
Connecticut	
Ansonia	John J. Stevens
Bridgeport	Worcester Warren
Bristol	Karl A. Reiche
Danbury	Harold F. Dow
Darien	Edward H. Fuller
Derby	Edward H. Fuller
E. Hartford	P. S. Barnes
E. Haven	W. E. Gillis
Enfield	E. H. Parkman
Fairfield	W. E. Smith
Glastonbury	Francis S. Knox
Greenwich	Edwin C. Andrews
Griswold	Chester L. Howe
Hamden	Margaret L. Keefe
Hartford	Fred D. Wish, Jr.
Killingly	W. E. Parker
Manchester	Fred A. Verplanck (Ninth District) A. F. Howes (Town Schools)
Meriden	.....
Middletown	Fred W. Shearer
Middletown (twn)	Van Buren Moody
Milford	C. W. Maddocks
Naugatuck	H. E. Chittenden
New Britain	S. H. Holmes
New Haven	Claude Russell
New London	Warren A. Hanson
Norwalk	Philip A. Jakob
Norwich	E. J. Graham
Plainfield	J. L. Chapman
Plainville	Leon C. Staples
Plymouth	H. S. Fisher
Putnam	Carl M. Diefenbach
Seymour	R. C. Clark
Shelton	Harry E. Fowler
Southington	H. S. Libby
Stafford	Francis S. Brick
Stamford	J. A. Ewart
Stratford	E. Ward Ireland
Torrington	G. J. Vogel
Vernon	H. O. Clough
Wallingford	H. M. Jeffords
Waterbury	M. C. Donovan
Watertown	G. C. Swift
West Hartford	Lloyd H. Bugbee
West Haven	Edgar C. Stiles
Westport	Heath E. White
Wethersfield	Wilson Greer
Winchester	L. R. McKusick
Windham	Egbert A. Case
Windsor	Daniel Howard
Delaware	
Wilmington	S. M. Stouffer
District of Columbia	
Washington	Frank W. Ballou
Florida	
Bartow	T. T. Hatton (a)
Bradenton	B. D. Gullett (a)
Clearwater	George M. Lynch (a)
Coral Gables	Charles M. Fisher (a)
Daytona Beach	G. W. Marks (a)
Deland	G. W. Marks (a)
Fort Lauderdale	Ulric J. Bennett (a)
Fort Myers	J. C. English (a)
Gainesville	E. R. Simmons (a)
Jacksonville	R. B. Rutherford (a)
Key West	M. E. Russell (a)
Lakeland	T. T. Hatton (a)
Lake Worth	J. A. Youngblood (a)
Miami	Charles M. Fisher (a)
Miami Beach	Charles M. Fisher (a)
Ocala	Mrs. I. T. Sprinkle(a)
Orlando	A. B. Johnson (a)
Palatka	C. H. Price (a)
Panama City	C. C. Mathis (a)
Pensacola	William Tyler (a)
Plant City	W. D. F. Snipes (a)
River Junction	.....
St. Augustine	C. G. Oldfather (a)
St. Petersburg	G. M. Lynch (a)
Sanford	T. W. Lawton (a)
Sarasota	T. W. Yarbrough
South Jacksonville	R. B. Rutherford (a)
Tallahassee	F. S. Hartsfield (a)
Tampa	W. D. F. Snipes (a)
West Palm Beach	J. A. Youngblood (a)
Winter Haven	T. T. Hatton
Georgia	
Albany	R. E. Brooks
Americus	J. E. Mathis
Athens	B. M. Grier
Atlanta	W. A. Sutton
Augusta	L. B. Evans
Bainbridge	E. G. Elcan
Brunswick	R. D. Eadie
Carrollton	W. Fred Gunn
Cartersville	H. B. Robertson
Cedartown	J. E. Purks
Columbus	R. B. Daniel
Cordele	D. H. Standard
Dalton	W. C. Jones
Decatur	Lamar Ferguson
Dublin	A. J. Hargrove
East Point	C. W. Reid
Fitzgerald	W. W. Stancil
Gainesville	W. P. Martin
Griffin	G. W. Wannamaker
Lagrange	F. F. Rowe
Macon	W. P. Jones
Marietta	C. A. Keith
Milledgeville	G. S. Roach
Moultrie	J. L. Yaden
Newnan	C. B. Mathews
Rome	B. F. Quigg
Savannah	O. B. Strong
Thomasville	B. B. Broughton
Valdosta	A. G. Cleveland
Waycross	Ralph Newton
Idaho	
Boise	C. F. Dienst
Coeur d'Alene	J. J. Rae
Idaho Falls	R. H. Snyder
Lewiston	Glenn W. Todd
Nampa	J. E. Walsh
Pocatello	J. M. McDonald
Twin Falls	W. B. Smith
Illinois	
Alton	W. R. Curtis
Aurora	K. D. Waldo (East Side) J. H. Smith (West Side)
Batavia	H. C. Strom
Beardstown	W. L. Gard
Belleville	H. V. Calhoun
Belvidere	R. E. Garrett
Benton	M. J. Carlton
Berwyn	William Hawkes (Dist. No. 98) E. W. Martin (Dist. No. 100)
Bloomington	S. K. McDowell
Blue Island	J. E. Lemon
Brookfield	E. C. Cassady
Cairo	J. W. Carrington
Calumet City	J. A. Wieland
Canton	R. W. Hyndman
Carbondale	A. R. Boone
Centralia	R. V. Jordon
Champaign	V. L. Nickell
Charleston	U. B. Jeffries
Chicago	William J. Bogan
Chicago Heights	F. T. Goodier
Cicero	G. A. Schwebel
Clinton	Arthur Verner
Collinsville	C. H. Dorris
Danville	C. E. Vance
Decatur	William Harris
De Kalb	F. N. Phillips
Des Plaines	E. R. Selleck
Dixon	I. B. Potter
Downers Grove	George De Wolf
Duquoin	Joe Strickler
East Moline	.....
East Peoria	Paul L. Bolin
East St. Louis	D. Walter Potts
Edwardsville	Charles F. Ford
Elgin	Theodore Saam
Elmhurst	D. L. Beggs
Elmwood Park	George N. Wells
Evanston	J. R. Skiles (Dist. No. 75) F. W. Nichols (Dist. No. 76)
Forest Park	W. S. Dimmett
Freeport	B. F. Shafer
Galesburg	O. O. Young
Gillespie	J. W. White
Glencoe	F. L. Redefer
Glen Ellyn	S. A. Denison
Granite City	Virgil Bufford
Harrisburg	Roscoe Pulliam
Harvey	.....
Herrin	John R. Creek
Highland Park	Jessie L. Smith (Dist. No. 107) Clark G. Wright (Dist. No. 108)
Hinsdale	A. F. Cook
Hoopeston	W. R. Lowery
Jacksonville	Ralph Yakel
Johnston City	Earl E. Miller
Joliet	H. Ambrose Perrin
Kankakee	A. P. Johnson
Kewanee	Charles A. Bruner
La Grange	J. C. Davies
Lake Forest	J. E. Baggett
La Salle	J. B. McManus
Lawrenceville	M. N. Todd
Lincoln	D. F. Nichols
Litchfield	Allen J. Black
Lombard	Mrs. Ada Manning
Macomb	G. A. Setters
Madison	E. W. Heob
Marion	H. O. Belford
Mattoon	H. B. Black
Maywood	Eugene La Rowe
Melrose Park	Eugene La Rowe
Metropolis	C. J. Ramsay
Moline	Edwin P. Nutting
Monmouth	Roy Fetherston
Morris	B. R. Bowden
Mount Carmel	R. S. Condrey
Mount Vernon	H. E. Bosley
Murphysboro	Sidna Mullineaux
Naperville	R. E. Beebe
Niles Center	R. E. Cotanche
Normal	Monroe Melton
North Chicago	F. E. De Yoe (Dist. No. 63) R. L. Newenham (Dist. No. 64)
Oak Park	W. J. Hamilton
Olney	C. I. Creamer
Ottawa	C. J. Byrne
Pana	J. L. Hart
Paris	John R. Moss
Park Ridge	Harry D. Winslow
Pekin	C. B. Smith
Peoria	E. C. Fisher
Peru	A. H. Kern
Pontiac	Ella Southers
Quincy	J. H. Steiner
River Forest	Anna L. Shinn
Riverside	Adam Priepot
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Rock Island	.....
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Springfield	Frank T. Vasey
Spring Valley	C. L. Sarver
Sterling	.....
Streator	H. B. Fisher
Summit	T. H. Pease
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Villa Park	H. E. Hinkel
Waukegan	John E. Clark
West Frankfort	C. A. Waller
Wheaton	K. K. Tibbetts
Wilmette	J. R. Harper
Winnetka	C. W. Washburne
Wood River	G. A. Smith
Woodstock	W. J. Calahan
Zion	.....

City	Superintendent
Indiana	
Anderson	W. A. Denny
Auburn	H. L. McKenney
Bedford	Warren J. Yount
Bicknell	Harold Axe
Bloomington	R. N. Tirey
Bluffton	O. M. Craig
Brazil	C. P. Keller
Clinton	L. E. Mitchell
Columbus	Donald Du Shane
Connersville	E. C. Dodson
Crawfordsville	M. C. Darnall
Decatur	M. F. Worthman
East Chicago	J. G. Rossman
Elkhart	J. F. Wiley
Elwood	William F. Smith
Evansville	J. O. Chewning
Fort Wayne	Fred H. Croninger (c)
Frankfort	J. W. Stott
Franklin	Arthur Campbell
Gary	William A. Wirt
Goshen	J. W. Foreman
Greensburg	Elmer C. Jerman
Hammond	L. L. Caldwell
Hartford City	H. Paul Kelsay
Hobart	Guy Dickey
Huntington	Glen H. Traw
Indianapolis	Paul C. Stetson
Jeffersonville	E. G. McCullum
Kendallville	H. M. Dixon
Kokomo	C. V. Haworth
Lafayette	A. E. Highley
La Porte	E. B. Wetherow
Lebanon	Paul Van Riper
Linton	T. J. Beecher
Logansport	W. L. Sprouse
Madison	E. O. Muncie
Marion	Elbert E. Day
Michigan City	Milo C. Murray
Mishawaka	P. C. Emmons
Mount Vernon	M. N. O'Bannon
Muncie	D. W. Horton
New Albany	H. A. Buerk
New Castle	E. J. Llewelyn
Peru	G. W. Youngblood
Plymouth	Ray Kuhn
Portland	J. C. Webb
Princeton	G. E. Derbyshire
Richmond	W. G. Bate
Rushville	L. A. Lockwood
Seymour	N. J. Lasher
Shelbyville	William F. Vogel
South Bend	Frank E. Allen
Sullivan	Dale C. Billman
Terre Haute	George C. Carroll
Valparaiso	Roy B. Julian
Vincennes	V. L. Eikenberry
Wabash	O. J. Neighbours
Warsaw	James M. Leffel
Washington	J. H. Shipp
West Lafayette	F. A. Burtsfield
Whiting	W. W. Borden
Iowa	
Ames	M. G. Davis
Atlantic	J. P. Street
Boone	G. S. Wooten
Burlington	W. G. Brooks
Cedar Falls	F. L. Mahannah
Cedar Rapids	Arthur Deamer
Centerville	E. W. Fannon
Chariton	J. R. Cougill
Charles City	P. C. Lapham
Cherokee	N. D. McCombs
Clinton	C. W. Brown
Council Bluffs	J. A. True
Creston	G. E. De Wolf
Davenport	Frank L. Smart
Des Moines	J. W. Studebaker
Dubuque	E. D. Cline
Fairfield	W. G. Pence
Fort Dodge	K. D. Miller
Fort Madison	A. I. Tiss
Iowa City	I. A. Opstad
Keokuk	R. L. Reid
Marshalltown	W. F. Shirley
Mason City	R. B. Irons
Muscatine	E. A. Sparling
Newton	B. C. Berg
Oelwein	G. B. Ferrell
Oskaloosa	R. B. Newman
Ottumwa	Roy F. Hannum
Perry	Agnes E. Heightshoe
Red Oak	J. R. Inman
Shenandoah	W. Dean McKee
Sioux City	L. W. Feik
Spencer	Burton R. Jones
Waterloo	Charles W. Kline (East Side) Charles A. Kittrell (West Side)
Webster City	Burrus E. Beard
Kansas	
Abilene	F. C. Gardner
Arkansas City	C. E. St. John
Atchison	W. D. Wolfe
Chanute	L. H. Petit
Coffeyville	A. I. Decker
Concordia	E. B. Allbaugh
Dodge City	W. M. Richards
Eldorado	J. F. Hughes
Emporia	L. A. Lowther
Fort Scott	V. M. Liston
Garden City	Ira O. Scott
Great Bend	H. C. Scarborough
Hutchinson	J. W. Gowans
Independence	J. H. Clement
Iola	A. M. Thoroman
Junction City	W. A. Wood
Kansas City	M. E. Pearson
Lawrence	C. E. Birch
Leavenworth	I. J. Bright
Liberal	N. B. Mahuron
Manhattan	W. E. Sheffer
McPherson	R. W. Potwin
Newton	J. B. Heffelfinger
Ottawa	A. F. Senter
Parsons	R. E. Hughes
Pittsburg	M. M. Rose
Pratt	Amos W. Glad
Salina	W. S. Heusner
Topeka	A. J. Stout
Wellington	.....
Wichita	L. W. Mayberry
Winfield	Evan E. Evans
Kentucky	
Ashland	J. D. Falls
Bellevue	L. F. Gilligan
Bowling Green	T. C. Cherry
Catlettsburg	J. T. Miracle
Corbin	G. W. Campbell
Covington	G. O. Swing
Danville	L. C. Bosley
Dayton	Olin W. Davis
Fort Thomas	D. W. Bridges
Frankfort	J. W. Ireland
Glasgow	.....
Hazard	R. T. Whittinghill
Henderson	C. E. Dudley
Hopkinsville	Gladstone Koffman
Jenkins	C. V. Snapp
Lexington	Henry H. Hill
Louisville	Frederick H. Archer
Ludlow	J. W. Smith
Madisonville	Harper Gatton
Mayfield	K. R. Patterson
Maysville	John Shaw
Middlesboro	J. W. Bradner
Newport	A. D. Owens
Owensboro	J. L. Foust
Paducah	L. J. Hanifan
Paris	Lee Kirkpatrick
Richmond	W. F. O'Donnell
Somerset	P. H. Hopkins
Winchester	E. F. Birckhead
Louisiana	
Alexandria	W. J. Avery (b)
Bastrop	E. D. Shaw (b)
Baton Rouge	W. B. Hatcher (b)
Bogalusa	M. O. Rudolph
Crowley	J. M. Baker (b)
Gretna	J. C. Ellis (b)
Hammond	C. C. Pittman (b)
Houma	H. L. Bourgeois (b)
Lafayette	J. W. Faulk (b)
Lake Charles	Ward Anderson
Minden	E. S. Richardson (b)
Monroe	E. L. Neville
Morgan City	L. A. Law (b)
New Iberia	L. G. Porter (b)
New Orleans	Nicholas Bauer (b)
Opelousas	W. B. Prescott (b)
Plaquemine	L. P. Terrebonne (b)
Shreveport	E. W. Jones (b)
West Monroe	T. O. Brown (b)
Maine	
Auburn	G. R. Gardner
Augusta	F. W. Burrill
Bangor	I. W. Small
Bath	C. D. Wilson
Biddeford	C. A. Weed
Brewer	H. R. Houston
Brunswick	Sherman Graves
Calais	F. C. English
Caribou	G. M. Carter
Gardiner	A. R. Carter
Houlton	George Cumming
Lewiston	C. W. Bickford
Millinocket	W. M. Marr
Oldtown	W. O. Chase
Portland	W. B. Jack
Rockland	E. L. Toner
Rumford	L. E. Williams
Saco	H. C. Hull
Sanford	J. A. Hamlin
Skowhegan	W. B. Woodbury
South Portland	L. C. Day
Waterville	C. E. Glover
Westbrook	Guy Sinclair
Maryland	
Annapolis	George Fox (a)
Baltimore	D. E. Weglein
Cambridge	J. B. Noble (a)
Cumberland	C. L. Kopp (a)
Frederick	J. C. Biehl (a) (c)
Frostburg	C. L. Kopp (a)
Hagerstown	B. J. Grimes (a)
Salisbury	J. M. Bennett (a)
Tacoma Park	Edwin W. Broome (a)
Massachusetts	
Abington	C. A. Record
Adams	R. A. Smith
Agawam	B. J. Phelps
Amesbury	R. R. Barr
Amherst	J. O. Cook
Andover	H. C. Sanborn
Arlington	C. A. Moody
Athol	L. M. Farrin
Attleboro	L. A. Fales
Auburn	C. M. Harris
Barnstable	C. E. Wheeler
Belmont	F. A. Scott
Beverly	S. H. Chace
Billerica	E. C. Vining
Boston	P. T. Campbell
Braintree	C. E. Fisher
Bridgewater	C. C. Putney
Brockton	J. F. Scully
Brookline	O. C. Gallagher
Cambridge	M. E. Fitzgerald
Canton	A. S. Ames
Chelmsford	G. S. Wright
Chelsea	G. C. Francis
Chicopee	J. J. Desmond, Jr.
Clinton	T. F. Gibbons
Concord	W. A. Hall
Danvers	I. G. Smith
Dartmouth	A. R. Paull
Dedham	J. C. Anthony
Dracut	C. L. Randall
Easthampton	H. D. Casey
Easton	G. C. Mann
Everett	Fairfield Whitney
Fairhaven	C. F. Prior
Fall River	H. L. Belisle
Fitchburg	J. M. McNamara
Foxborough	Chase McArthur
Framingham	B. J. Merriam
Franklin	A. W. Hale
Gardner	F. T. Reynolds
Gloucester	E. W. Fellows
Grafton	A. S. Cole
Great Barrington	R. H. Bellows
Greenfield	F. W. Porter
Haverhill	A. L. Barbour
Hingham	O. K. Collins
Holyoke	W. R. Peck
Hudson	B. D. Brown
Ipswich	J. I. Horton
Lawrence	B. M. Sheridan

City	Superintendent
Leominster	W. H. Perry
Lexington	T. S. Grindle
Lowell	H. J. Molloy
Ludlow	R. D. Tucker
Lynn	H. S. Gruver
Malden	F. G. Marshall
Mansfield	L. L. Woods
Marblehead	F. H. Hill
Marlboro	E. P. Carr
Maynard	C. H. Walker
Medford	J. S. Kadesch
Melrose	H. H. Stuart
Methuen	L. H. Conant
Middleboro	J. S. Cushing
Milford	A. O. Caswell
Millbury	C. C. Ferguson
Milton	H. F. Turner
Montague	J. S. Keating
Natick	C. R. Hall
Needham	J. C. Davis
New Bedford	A. P. Keith
Newburyport	S. M. King
Newton	U. G. Wheeler
North Adams	G. C. Bowman
Northampton	F. K. Congdon
North Andover	F. E. Pitkin
North Attleboro	G. W. Morris
Northbridge	H. J. Phipps
Norwood	L. W. Grant
Orange	E. C. Hempel
Palmer	C. H. Hobson
Peabody	Thos. W. Sheehan
Pittsfield	J. F. Gannon
Plymouth	A. B. Handy
Quincy	J. N. Muir
Randolph	A. O. Christiansen
Reading	A. L. Safford
Revere	C. F. Lindstol
Rockland	R. S. Esten
Salem	G. M. Bemis
Saugus	J. W. Lambert
Shrewsbury	M. A. Sturtevant
Somerset	H. F. Bates
Somerville	E. W. Ireland
Southbridge	F. E. Corbin
South Hadley	R. D. Tucker
Spencer	I. H. Agard
Springfield	Z. E. Scott
Stoneham	C. E. Varney
Stoughton	Warren B. Lyman
Swampscott	Frank L. Mansur
Taunton	W. A. Mowry
Tewksbury	S. G. Bean
Uxbridge	A. B. Garcelon
Wakefield	W. B. Atwell
Walpole	A. S. Jones
Waltham	W. H. Slayton
Ware	W. R. Barry
Wareham	Bion C. Merry
Watertown	W. H. Price
Webster	J. A. Lobban
Wellesley	S. M. Graves
Westboro	J. H. Armstrong
Westfield	C. D. Stiles
West Springfield	J. R. Fausey
Weymouth	P. T. Pearson
Whitman	F. E. Holt
Winchendon	G. W. Vail
Winchester	J. J. Quinn
Winthrop	E. R. Clarke
Woburn	G. I. Clapp
Worcester	W. S. Young
Michigan	
Adrian	Ernest J. Reed
Albion	Don Harrington
Alma	F. R. Phillips
Alpena	George H. Curtis
Ann Arbor	O. W. Haisley
Battle Creek	W. G. Coburn
Bay City	G. L. Jenner
Benton Harbor	S. C. Mitchell
Berkeley	R. B. French
Birmingham	C. W. Crandell
Cadillac	B. C. Shankland
Charlotte	E. H. Chapelle
Coldwater	J. T. Symons
Dearborn	Ray H. Adams
Detroit	Frank Cody
Dowagiac	C. M. Horn
East Detroit	John Kantner
Ecorse	C. J. Miller
Escanaba	R. E. Cheney
Ferndale	E. F. Down
Flint	L. H. Lamb
Gladstone	A. R. Watson
Grand Haven	E. H. Babcock
Grand Rapids	L. A. Butler
Grosse Point	S. M. Brownell
Grosse Point Park	.....
Hamtramck	M. R. Keyworth
Hancock	Leonard M. Niece
Hastings	D. A. Van Buskirk
Highland Park	I. M. Allen
Hillsdale	L. P. Holliday
Holland	E. E. Fell
Ionia	A. A. Rather
Iron Mountain	M. B. Travis
Ironwood	Arthur E. Erickson
Ishpeming	C. L. Phelps
Jackson	Harold Steele
Kalamazoo	E. H. Drake
Kingsford	Frank C. Sweeney
Lansing	J. W. Sexton
Lapeer	E. E. Irwin
Lincoln Park	Leo W. Huff
Ludington	H. E. Waits
Manistee	Benj. Klager
Manistique	A. F. Hall
Marquette	W. M. Whitman
Marshall	H. W. Holmes
Menominee	J. L. Silvernale
Midland	J. J. Schafer
Monroe	George T. Cantrick
Mount Clemens	L. W. Fast
Mount Pleasant	G. E. Ganiard
Muskegon	John A. Craig
Muskegon Heights	W. R. Booker
Negaunee	H. S. Doolittle
Niles	F. W. Crawford
Owosso	E. J. Willman
Petoskey	H. C. Spitler
Pontiac	James H. Harris
Port Huron	L. A. Packard
River Rouge	A. McDonald
Roseville	A. A. Neverth
Royal Oak	N. J. Quickstad
Saginaw	C. F. Miller
St. Clair Shores	T. V. Eddy
St. Joseph	E. P. Clarke
Sault Ste. Marie	G. G. Malcolm
Sturgis	C. M. Ferner
Three Rivers	C. H. Carrick
Traverse City	C. L. Poor
Ypsilanti	A. G. Erickson
Minnesota	
Albert Lea	A. L. Gaarder
Austin	S. T. Neveln
Bemidji	J. W. Smith
Brainerd	W. C. Cobb
Chisholm	J. P. Vaughan
Cloquet	E. B. Anderson
Columbia Heights	H. C. Nelson
Crookston	Arnold Gloor
Duluth	Leonard Young
Ely	W. E. Englund
Eveleth	Daniel B. Heller
Fairmont	R. H. Towne
Faribault	H. H. Kirk
Fergus Falls	Alvin T. Stolen
Hastings	E. A. Durbahn
Hibbing	J. W. Richardson
International Falls	Harold R. Peterson
Little Falls	E. C. Van Dusen
Mankato	J. E. Anderson
Minneapolis	C. R. Reed
Moorhead	S. G. Reinertsen
New Ulm	F. B. Andreen
Owatonna	John J. Skinner
Red Wing	G. V. Kinney
Rochester	G. H. Sanberg
St. Cloud	H. B. Gough
St. Paul	S. O. Hartwell
South St. Paul	Irvin T. Simley
Stillwater	Guy D. Smith
Virginia	R. H. Brown
Willmar	A. M. Wisness
Winona	D. F. Dickerson
Mississippi	
Biloxi	A. L. May
Brookhaven	Edgar S. Bowlus
Clarksdale	H. B. Heidelberg
Columbus	C. N. Brandon
Corinth	Hal Anderson
Greenville	E. E. Bass
Greenwood	W. C. Williams
Gulfport	B. Frank Brown
Hattiesburg	W. I. Thames
Jackson	Edward L. Bailey
Laurel	R. H. Watkins
McComb	Joseph E. Gibson
Meridian	H. M. Ivy
Natchez	W. H. Braden
Tupelo	Charles F. Capps
Vicksburg	H. V. Cooper
Yazoo City	R. L. Bedwell
Missouri	
Boonville	L. E. Ziegler
Brookfield	L. V. Crookshank
Cape Girardeau	J. A. Whiteford
Carthage	J. L. Campbell
Chillicothe	E. R. Adams
Clayton	John L. Bracken
Clinton	Arthur Lee
Columbia	W. I. Oliver
De Soto	O. T. Coil
Fulton	J. T. Bush
Hannibal	E. T. Miller
Independence	E. B. Street
Jefferson City	William F. Knox
Joplin	E. A. Elliott
Kansas City	George Melcher
Kirksville	J. H. Neville
Kirkwood	F. P. Tillman
Maplewood	G. E. Dille
Marshall	W. M. Westbrook
Maryville	J. L. Lawing
Mexico	L. H. Hawthorne
Moberly	M. F. Beach
Nevada	Wade Fowler
Poplar Bluff	G. F. Loughead
Richmond Heights	P. L. Collier
St. Charles	Stephen Blackhurst
St. Joseph	F. H. Barbee
St. Louis	Henry J. Gerling
Sedalia	Heber U. Hunt
Sikeston	Roy V. Ellise
Springfield	Harry P. Study
Trenton	W. H. McDonald
University City	Charles Banks
Warrensburg	Edward Beatty
Washington	C. J. Burger
Webb City	D. R. McDonald
Webster Groves	W. E. Goslin
Montana	
Anaconda	W. K. Dwyer
Billings	A. T. Peterson
Bozeman	D. S. Williams
Butte	J. G. Ragsdale
Great Falls	Irving W. Smith
Havre	W. J. Shirley
Helena	R. O. Evans
Kalispell	W. D. Swetland
Lewistown	C. G. Manning
Livingston	B. A. Winans
Miles City	Glen G. Eye
Missoula	Ira B. Free
Nebraska	
Alliance	H. G. Partridge
Beatrice	E. L. Novotny
Columbus	R. R. McGee
Fairbury	W. E. Scott
Falls City	A. B. Gelwick
Fremont	A. H. Waterhouse
Grand Island	C. Ray Gates
Hastings	A. H. Staley
Kearney	O. A. Wirsig
Lincoln	M. C. Lefler
McCook	J. C. Mitchell
Nebraska City	G. G. Warren
Norfolk	A. P. Burkhart
North Platte	W. J. Braham
Omaha	J. H. Beveridge
Scottsbluff	A. L. Burnham
York	E. L. Weaver

City	Superintendent
Nevada	
Las Vegas	Maude Frazier
Reno	B. D. Billinghurst
New Hampshire	
Berlin	Frank C. Ketler
Claremont	A. B. Kellogg
Concord	L. J. Rundlett
Derry	
Dover	J. E. Wignot
Franklin	Fred S. Libbey
Keene	W. E. Hammond
Laconia	John S. Gilman
Lebanon	W. J. English
Manchester	L. P. Benezet
Nashua	Earle T. Tracey
Portsmouth	Harry L. Moore
Rochester	William H. Buker
Somersworth	H. L. Winslow
New Jersey	
Asbury Park	A. E. Kraybill
Atlantic City	Arthur Chanoweth
Audubon	William L. Fidler
Bayonne	Preston H. Smith
Belleville	W. R. Parmer
Bergenfield	Roy W. Brown
Bloomfield	Edgar S. Stover
Bogota	Frank E. Tilton
Boonton	Clarence E. Boyer
Bound Brook	Albert S. Davis
Bridgeton	Chester Robbins
Burlington	Vann H. Smith
Caldwell	D. C. Barnett
Camden	Leon N. Neulen
Carlstadt	George Kintner
Carteret	Barbara V. Hermann
Cliffside Park	George F. Hall
Clifton	George J. Smith
Collingswood	John B. Ritter
Cranford	Sarah Edmond
Dover	R. S. Bowlby
Dumont	L. J. Honiss
Dunellen	R. W. Crane
East Orange	C. J. Scott
East Rutherford	Frank J. Oglee
Elizabeth	Ira T. Chapman
Englewood	Winton J. White
Fairview	Z. G. Masten, Jr.
Fort Lee	Arthur E. Chase
Freehold	Lloyd S. Cassel
Garfield	W. H. Steegar
Glen Ridge	H. W. Dutch
Gloucester	Charles C. Madeira
Guttenburg	Mrs. Anna L. Klein
Hackensack	William A. Smith
Haddonfield	Allen S. Martin
Haddon Heights	William C. Davis
Hammonton	H. H. Smith
Harrison	John P. Murray
Hasbrouck H'ghts	C. C. Hitchcock
Hawthorne	F. H. Thomas
Highland Park	F. Willard Furth
Hillside	A. G. Woodfield
Hoboken	Daniel S. Kealey
Irvington	Robert L. Saunders
Jersey City	James A. Nugent
Kearny	Herman Dressel
Leonia	Nelson C. Smith
Linden	D. A. Howell
Lodi	Henry V. Matthews
Long Branch	Charles T. Stone
Lyndhurst	R. D. Batten
Madison	Harry A. Wann
Manville	B. J. Boyer
Metuchen	Carl H. Galloway
Montclair	Frank G. Pickell
Morristown	J. Burton Wiley
Neptune Towns'p	O. J. Moulton
Newark	John H. Logan
New Brunswick	F. J. Sickles
Newton	C. H. Reagle
North Arlington	Louis D. Carr
North Bergen	M. F. Husted
Nutley	Paul C. Radcliffe
Ocean City	George E. Brown
Orange	W. B. Patrick
Palisades Park	Carl A. Marsden
Passaic	A. D. Arnold
Paterson	John R. Wilson
Paulsboro	Wilmer F. Burns
Pensauken Twp.	George B. Fine
Phillipsburg	Frank D. Munroe
Plainfield	F. W. Cook
Princeton	Mabel T. Vanderbilt
Prospect Park	Thomas L. Bump
Rahway	Arthur Perry
Red Bank	Edwin C. Gilland
Ridgefield	Charles Dixon
Ridgewood	I. B. Somerville
Roselle	John R. Patterson
Roselle Park	E. F. Smith
Rutherford	C. A. Fetterly
Salem	L. M. Lott
Sayreville	Jene Selover
Secaucus	M. J. Pechtel
Somerville	T. Latimer Brooks
South Amboy	Oscar O. Barr
South Orange	John H. Bosshart
South Plainfield	Harry C. Fries
South River	William S. Lesh
Summit	John B. Dougall
Teaneck	Lester N. Neulen
Tenafly	George A. Kipp
Trenton	Paul Loser
Union City	Arthur O. Smith
Union Twp.	Edward F. Waldron
Ventnor	H. R. Jackson
Verona	F. N. Brown
Vineland	H. W. Weidner
Wallington	Joseph F. Moriarty
Weehawken	R. E. Pinkham
Westfield	C. A. Philhower
West New York	H. L. Bain
West Orange	S. C. Strong
Woodridge	Benjamin E. Farr
New Mexico	
Albuquerque	John Milne
Clovis	J. M. Bickley
Gallup	C. B. Redick
Las Cruces	L. M. Cook
Raton	D. W. MacKay
Roswell	D. N. Pope
Santa Fe	Isabel L. Eckles
New York	
Albany	C. Edward Jones
Amsterdam	Wilbur H. Lynch
Auburn	George F. Barford
Batavia	Clyde P. Wells
Beacon	E. D. Hewes
Binghamton	Daniel J. Kelly
Bronxville	Willard W. Beatty
Buffalo	E. C. Hartwell
Canadaigua	Frank E. Fisk
Catskill	J. T. Kaemmerlin
Cohoes	William S. Schneider
Corning	William E. Severn (Dist. No. 9) A. M. Blodgett (Dist. No. 13)
Cortland	Leo T. Wilcox
Depew	George R. Crego
Dobbs Ferry	J. A. McGinness
Dunkirk	F. K. Darling
East Rochester	B. H. Root
Elmira	H. O. Hutchinson
Elmira Heights	Horace Beach
Endicott	Herbert H. Crumb
Floral Park	
Fredonia	Claude R. Dye
Freeport	John W. Dodd
Fulton	George R. Bodley
Garden City	Winfield A. Townsend
Geneva	W. L. Houseman
Glen Cove	H. H. Chapman
Glens Falls	A. W. Miller
Gloversville	H. W. Langworthy
Hastings-on-Hudson	John L. Hopkins
Haverstraw	A. P. Burroughs
Hempstead	T. P. Calkins
Herkimer	Loraine W. Bills
Hornell	Harrison S. Dodge
Hudson	M. C. Smith
Hudson Falls	David R. Finley
Ilion	Earl P. Watkin
Ithaca	C. L. Kulp
Jamestown	George A. Persell
Johnson City	H. B. Eccleston
Johnstown	E. L. Ackley
Kenmore	F. C. Densberger
Kingston	B. C. Van Ingen
Lackawanna	William J. Breen
Lancaster	Frank L. Smith
Little Falls	F. R. Wegner
Lockport	R. B. Kelley
Long Beach	Walter J. Schwalje
Lynbrook	C. D. Vosburgh
Malone	Horace H. Lamberton
Mamaroneck	Arthur Z. Boothby
Massena	E. G. Simmons
Mechanicville	Evan E. Jones
Medina	H. E. Brown
Middletown	E. H. Burdick
Mineola	Harlan B. Allen
Mount Kisco	H. M. Jennings
Mount Vernon	William H. Holmes
Newark	F. Neff Stroup
Newburgh	Marion W. Longman
New Rochelle	C. S. Bragdon
New York	William J. O'Shea
Niagara Falls	James F. Taylor
North Tarrytown	C. A. Benedict
North Tonawanda	Claude L. Moss
Norwich	F. R. Wassung
Nyack	K. R. MacCalman
Ogdensburg	Arthur J. Laidlaw
Olean	W. C. Greenawalt
Oneida	Albert H. Covell
Oneonta	George J. Dann
Ossining	Everett A. Barto
Oswego	Frederick Leighton
Patchogue	Sheridan Linn
Peekskill	Paul R. Spencer
Penn Yan	C. G. Hetherington
Plattsburg	G. M. Elmendorf
Port Chester	Alvah G. Frost
Port Jervis	A. H. Naylor
Poughkeepsie	Ward C. Moon
Rensselaer	Walter S. Clark
Rochester	Herbert S. Weet
Rockville Center	William S. Covert
Rome	George R. Staley
Rye Neck	F. E. Bellows
Salamanca	George A. Place
Saranac Lake	H. V. Littell
Saratoga Springs	Harris Crandall
Scarsdale	Ralph I. Underhill
Schenectady	W. H. Pillsbury
Scotia	B. W. Conrad
Seneca Falls	Hubert Mott
Solvay	Claude A. Duvall
Syracuse	G. Carl Alverson
Tarrytown	L. V. Case
Tonawanda	Walter S. Fraser
Troy	Neil K. White (Lansingburg Dist.) George H. Krug (Union District)
Tupper Lake	R. E. Minnich
Utica	John A. De Camp
Watertown	R. C. Burdick
Watervliet	William Richmond
Waverly	P. C. Meserve
Wellsville	George F. Jammer
Whitehall	Page E. Cole
White Plains	John W. Lumbard
Yonkers	Lamont F. Hodge
North Carolina	
Asheboro	R. J. Hilker
Asheville	W. L. Brooker
Burlington	C. C. Haworth
Canton	A. J. Hutchins
Charlotte	H. P. Harding
Concord	A. S. Webb
Durham	Frank M. Martin
Elizabeth City	E. H. Hartsell
Fayetteville	Horace Sisk
Gastonia	W. P. Grier
Goldsboro	Ray Armstrong
Greensboro	Guy B. Phillips
Greenville	J. H. Rose
Henderson	E. M. Rollins
Hendersonville	
Hickory	R. W. Carver
High Point	T. Wingate Andrews
Kings Mountain	Claude Grigg
Kinston	W. A. Graham
Lenoir	C. S. Warren
Lexington	A. W. Honeycutt
Monroe	G. W. Bradshaw
Mooresville	H. C. Miller
Morganton	W. F. Starnes
Mount Airy	L. B. Pendergraph
New Bern	H. B. Smith

City	Superintendent
Raleigh	P. S. Daniel
Reidsville	Fred M. Arrowood
Rocky Mount	R. M. Wilson
Salisbury	.....
Shelby	B. L. Smith
Statesville	R. M. Gray
Tarboro	W. A. Mahler
Thomasville	D. W. Maddox
Washington	H. M. Roland
Wilmington	O. A. Hamilton
Wilson	K. R. Curtis
Winston-Salem	R. H. Latham.
North Dakota	
Bismarck	H. O. Saxvik
Devils Lake	F. H. Gilliland
Dickinson	P. S. Berg
Fargo	J. G. Moore
Grand Forks	John C. West
Jamestown	C. L. Robertson
Mandan	J. C. Gould
Minot	L. A. White
Valley City	G. W. Hanna
Williston	J. N. Urness
Ohio	
Akron	Thomas W. Gosling
Alliance	B. F. Stanton
Ashland	E. L. Bowsher
Ashtabula	M. S. Mitchell
Barberton	U. L. Light
Bedford	A. E. Moody
Bellaire	J. V. Nelson
Bellefontaine	S. A. Frampton
Bellevue	C. M. Carrick
Berea	A. G. Yawberg
Bexley	H. C. Dietrich
Bowling Green	Arch B. Conklin
Bucyrus	E. N. Dietrich
Cambridge	Hugh R. Hick
Campbell	W. M. Coursen
Canton	Jesse H. Mason
Chillicothe	W. L. Miller
Cincinnati	Edward D. Roberts
Circleville	J. O. Eagleson
Cleveland	R. G. Jones
Cleveland H'ghts	Frank L. Wiley
Columbus	J. G. Collicott
Conneaut	C. M. Dickey
Coshocton	A. C. Pence
Cuyahoga Falls	W. H. Richardson
Dayton	C. V. Courter
Defiance	E. W. Howey
Delaware	R. D. Conrad
Delphos	E. W. Bell
Dover	S. O. Mase
East Cleveland	W. H. Kirk
East Liverpool	Herbert G. Means
East Palestine	C. E. Palmer
Elyria	R. C. Maston
Euclid	W. A. Franks
Findlay	I. F. Matteson
Fostoria	J. M. Reed
Fremont	C. A. Hudson
Galion	J. F. Bemiller
Gallipolis	Wayne Lutz
Garfield Heights	Glen D. King
Girard	E. O. Trescott
Grandview H'ghts (Columbus P. O.)	W. C. Rohleder
Greenville	C. L. Bailey
Hamilton	D. R. Baker
Ironton	Harper C. Pendry
Jackson	H. L. Bates
Kent	W. A. Walls
Kenton	D. B. Clark
Lakewood	Julius E. Warren
Lancaster	Carl H. Griffey
Lima	R. E. Offenhauer
Lockland	J. U. Dungan
Logan	G. E. Carr
Lorain	D. J. Boone
Mansfield	C. A. Waltz
Maple Heights (Bedford P. O.)	C. R. Dustin
Marietta	H. L. Sullivan
Marion	George A. Bowman
Martins Ferry	W. L. Kocher
Massillon	Harry R. Gorrell
Miamisburg	Harris V. Bear
Middletown	R. W. Solomon
Mingo Junction	Claude A. Bruner
Mount Vernon	A. W. Elliott
Nelsonville	E. J. Arnold
Newark	Oren J. Barnes
New Boston	D. E. Ross
New Philadelphia	F. P. Geiger
Niles	R. J. Kiefer
Norwalk	C. C. Patterson
Norwood	C. W. Johnson
Oakwood (Dayton P. O.)	A. E. Claggett
Painesville	C. C. Pierce
Parma	M. M. Berry
Piqua	G. C. Dietrich
Portsmouth	Frank Appel
Ravenna	O. E. Pore
Reading	H. L. Bussey
Rocky River	W. W. Ankenbrand
St. Bernard	F. M. Reynolds
St. Marys	C. C. McBroom
Salem	E. S. Kerr
Sandusky	F. J. Prout
Shaker Heights	F. H. Bair
Shelby	R. I. Lewis
Sidney	C. C. Crawford
Springfield	F. M. Shelton
Steubenville	Robert L. Erwin
Struthers	H. S. Floyd
Tiffin	Paul V. Brown
Toledo	Charles S. Meek
Toronto	S. C. Dennis
Troy	T. E. Hook
Uhrichsville	H. B. Galbraith
Urbana	C. W. Cookson
Van Wert	U. E. Diener
Wadsworth	Frank H. Close
Wapakoneta	M. R. Menschel
Warren	H. B. Turner
Washington Court House	A. D. St. Clair
Wellston	W. G. Scarberry
Wellsville	S. E. Daw
Wilmington	H. W. Hodson
Wooster	George C. Maurer
Xenia	L. F. Hammerle
Youngstown	Geo. E. Roudebush
Zanesville	C. T. Prose
Oklahoma	
Ada	I. S. Hinshaw
Altus	M. L. Cotton
Alva	C. A. Parker
Anadarko	H. L. Hensley
Ardmore	J. J. Godbey
Bartlesville	C. O. Haskell
Blackwell	Harry Hutson
Bristow	E. H. Black
Chickasha	T. T. Montgomery
Clinton	George D. Hann
Cushing	J. E. Hickman
Duncan	Chester P. Davis
Durant	G. T. Stubbs
Elk City	A. M. Keeth
El Reno	H. E. Wrinkle
Enid	E. D. Price
Guthrie	W. A. Greene
Henryetta	Edwin O. Shaw
Holdenville	Lanson D. Mitchell
Hugo	A. D. Hanry
Lawton	B. C. Swinney
McAlester	M. J. Hale
Miami	R. C. Nichols
Muskogee	J. R. Holmes
Norman	Elmer Capshaw
Oklahoma City	C. K. Reiff
Okmulgee	W. Max Chambers
Pawhuska	J. R. Chandler
Picher	Paul L. Heilman
Ponca City	W. W. Isle
Sand Springs	H. Clay Fisk
Sapulpa	E. H. McCune
Seminole	John G. Mitchell
Shawnee	Perry Carmichael
Stillwater	John T. Hefley
Tulsa	Merle C. Prunty
Wewoka	Harry D. Simmons
Woodward	E. H. Homberger
Oregon	
Albany	G. E. Finnerty
Astoria	A. C. Hampton
Baker	Hugh Coleman
Bend	G. W. Ager
Corvallis	H. W. Adams
Eugene	H. R. Goold
Klamath Falls	J. P. Wells
La Grande	J. T. Longfellow
Marshfield	Lynn A. Parr
Medford	E. H. Hedrick
Oregon City	Roy W. Glass
Pendleton	Austin Landreth
Portland	Charles A. Rice
Salem	George W. Hug
The Dalles	C. W. Boetticher
Pennsylvania	
Abington	Edward S. Ling
Aliquippa	H. R. Vanderslice
Allentown	H. W. Dodd
Altoona	Robert E. Laramy
Ambridge	C. Herman Grose
Archbald	W. A. Kelly
Arnold	Donald P. Davis
Ashland	Edward W. Taylor
Ashley	John P. Gibbons
Avalon	S. Todd Perley
Bangor	O. W. Ackerman
Beaver	D. H. Stewart
Beaver Falls	Floyd Atwell
Bellevue	J. Nelson Mowls
Berwick	M. E. Houck
Bethlehem	W. H. Weiss
Blairsville	B. L. Gumm
Blakely Boro. (Address Peckville)	H. B. Anthony
Bloomsburg	C. H. Garwood
Brackenridge	Robert R. Anderson
Braddock	T. G. McCleary
Bradford	James F. Butterworth
Brentwood	J. D. Boydston
Bridgeport	Chester H. Barnes
Bristol	Howard E. James
Butler	John A. Gibson
Canonsburg	F. W. McVay
Carbondale	James J. Crane
Carlisle	J. W. Potter
Carnegie	Norman L. Glasser
Centerville	C. H. Lyon
Chambersburg	U. L. Gordy
Charleroi	T. L. Pollock
Cheltenham twp. (Address Elkins Park)	Albert L. Rowland
Chester	David A. Ward
Clairton	H. D. Teal
Clearfield	George E. Zerfoss
Clifton Heights	William H. Brown
Coaldale	J. E. Gildea
Coatesville	Carl O. Benner
Collingdale	J. C. Carey
Columbia	J. B. Kennedy
Connellsville	Bela B. Smith
Conshohocken	Robert C. Landis
Coraopolis	J. C. Werner
Corry	Ralph S. Dewey
Crafton	E. O. Liggitt
Danville	E. B. Cline
Darby	W. R. Douthett
Dickson City	P. M. Brennan
Donora	Rex W. Dimmick
Dormont	Ralph Radcliffe
Du Bois	C. J. Alderfer
Dunmore	J. R. Gilligan
Dupont	Cecile T. Dugan
Duquesne	C. H. Wolford
Duryea	John J. Joyce
Easton	James C. Bay
East Pittsburgh	Charles F. Young
East Stroudsburg	Elmer E. Kuntz
Edwardsville	Victor E. Lewis
Ellwood City	W. Ray Smith
Emaus	H. J. Yeager
Erie	John C. Diehl
Etna	William M. Stewart
Exeter	John B. Campbell
Farrell	W. W. Irwin
Ford City	Quincey G. Vincent
Forest City	Jules J. Kerl
Forty Fort	F. A. Berkenstock
Frackville	W. R. Trautman
Franklin	C. E. Carter
Freeland	N. P. Luckenbill
Gettysburg	L. C. Keefauver
Glassport	John S. Hart

City	Superintendent
Greensburg	Thomas S. March
Greenville	R. D. Welch
Grove City	H. M. B. Lehn
Hanover	F. M. Haiston
Hanover twp.	Edward S. Williams
Harrisburg	Martin H. Thomas
Harrison	M. G. Morris
Haverford	J. Frank Carter
Hazleton	A. D. Thomas
Hollidaysburg	C. V. Erdly
Homestead	Port Eckles
Honesdale	J. J. Koehler
Huntington	E. R. Barclay
Indiana	Norman C. Koontz
Jeanette	E. W. Long
Jersey Shore	Frank H. Painter
Johnstown	James Killius
Kane	.....
Kingston	J. R. Merkel
Kittanning	Clyde W. Cranmer
Kulpmont	J. A. Shovlin
Lancaster	H. E. Gress
Lansdale	Ralph R. Smith
Lansdowne	Charles S. Miller
Lansford	E. M. Balsbaugh
Larksville	Thomas F. Feeney
Latrobe	John G. Hulton
Lebanon	R. R. Abernethy
Lehighton	Bert B. David
Lewistown	Charles Coxe
Lock Haven	J. F. Puderbaugh
Lower Merion twp. (Address Ardmore)	S. Edgar Downs
Luzerne	Arthur E. Booth
Luzerne twp. (Address South Brownsville)	James J. Pauley
Mahanoy City	H. A. Oday
McAdoo	Sallie L. Ferry
McKeesport	Joseph B. Richey
McKees Rocks	T. K. Johnston
Meadville	Warren P. Norton
Mechanicsburg	R. L. Van Scoten
Media	W. H. Michaels
Middletown	H. J. Wickey
Midland	H. V. Herlinger
Millvale	C. C. Williamson
Milton	Carl L. Millward
Minersville	C. E. Roudabush
Monessen	Samuel Fausold
Monongahela	John H. Dorr
Morrisville	M. R. Reiter
Mount Carmel	Wilbur M. Yeingst
Mount Lebanon	Herman C. Grose
Mount Oliver	Minnie Ubinger
Mount Pleasant	J. C. Haberlen
Munhall	Charles R. Stone
Nanticoke	A. P. Diffendafer
Nanty-Glo	Harry E. Hogue
Nazareth	F. A. Marcks
New Brighton	S. W. Lyons
New Castle	Clyde C. Green
New Kensington	E. T. Chapman
Norristown	H. O. Dietrich
Northampton	G. A. Eichler
North Braddock	F. D. Zuerner
Oakmont	W. Lee Gilmore
Oil City	R. A. Baum
Old Forge	B. T. Harris
Olyphant	John A. Dempsey
Palmerton	J. N. Roeder
Parnassus	Joseph L. Black
Philadelphia	Edwin C. Broome
Phoenixville	Martin L. Peters
Pitcairn	C. C. Pearsall
Pittsburgh	Ben G. Graham
Pittston	D. J. Cray
Plains	J. A. McCaa
Plymouth	H. S. Jones
Pottstown	F. Herman Fritz
Pottsville	L. A. BuDahn
Punxsutawney	F. S. Jackson
Rankin	Frank J. Good
Reading	Amanda E. Stout
Ridgway	W. M. Pierce
Rochester	D. M. Albright
St. Clair	Charles R. Birch
St. Marys	J. J. Lynch
Sayre	L. E. De Laney
Schuylkill Haven	Paul S. Christman
Scottdale	S. B. Bulick
Scranton	John H. Dyer
Sewickley	L. H. Conway
Shamokin	P. E. Whitmeyer
Sharon	W. D. Gamble
Sharpsburg	J. J. Donovan
Sharpsville	Harry E. Pebly
Shenandoah	A. J. Ratchford
South Brownsville	William O. Duck
South Williamsport	A. B. Elder
Steelton	Charles S. Davis
Stowe	Gale F. Stroup
Stroudsburg	Robert Brown
Summit Hill	E. T. McCready
Sunbury	J. E. Shambach
Swissvale	C. C. Kelso
Swoyerville	Joseph H. Finn
Tamaqua	F. G. Horner
Tarentum	A. D. Endsley
Taylor	W. S. Robinson
Throop	John J. O'Hara
Titusville	G. A. Stetson
Turtle Creek	W. A. Rodgers
Tyrone	W. W. Eisenhart
Uniontown	Milton D. Proctor
Upper Darby	William C. Sampson
Vandergrift	Charles H. Omo
Warren	P. W. M. Pressel
Washington	Meyers B. Horner
Waynesboro	D. J. Keener
West Chester	Walter L. Philips
West Hazleton	E. S. Teter
West Pittston	R. J. W. Templin
West View	H. N. Hennon
West York	A. H. Martin
Wilkes-Barre	H. H. Zeiser
Wilkinsburg	W. C. Graham
Williamsport	A. M. Weaver
Wilmerding	Charles W. Shaffer
Wilson Boro. (Address Easton)	C. E. Furst
Windber	J. W. Hedge
Winton Boro. (Address Jessup)	J. L. McCloskey
York	A. W. Ferguson
Rhode Island	
Barrington	Charles H. Keyes
Bristol	E. S. Mapes
Burrillville	J. C. Sweeney
Central Falls	James E. Martin
Coventry	R. E. E. Campbell
Cranston	John K. Fenner
Cumberland	Emma M. Caufield
East Providence	J. R. D. Oldham
Johnston	T. H. De Coudres
Lincoln	John L. Smith
Newport	Harold T. Lowe
North Providence	James L. McGuire
Pawtucket	William A. Newell
Providence	A. J. Stoddard
South Kingstown	E. K. Wilcox
Warren	Leroy G. Staples
Warwick	Warren A. Sherman
Westerly	Willard H. Bacon
West Warwick	John F. Deering
Woonsocket	James F. Rockett
South Carolina	
Aiken	.....
Anderson	E. C. McCants
Camden	J. G. Richards, Jr.
Charleston	A. B. Rhett
Chester	Myron E. Brockman
Clinton	J. H. Witherspoon
Columbia	A. C. Flora
Darlington	J. C. Daniel
Florence	John W. Moore
Gaffney	W. E. Sawyer
Georgetown	W. C. Bynum
Greenville	J. L. Mann
Greenwood	W. E. Black
Hartsville	J. H. Thornwell
Laurens	C. K. Wright
Newberry	O. B. Cannon
Orangeburg	A. J. Thackson
Rock Hill	R. C. Burts
Spartanburg	Frank Evans
Sumter	S. H. Edmunds
Union	T. C. Jolly, Jr.
South Dakota	
Aberdeen	C. L. Dalthorp
Huron	Andrew J. Lang
Lead	R. V. Hunkins
Mitchell	John C. Lindsey
Rapid City	E. B. Bergquist
Sioux Falls	A. A. McDonald
Watertown	H. Mackenzie
Yankton	C. A. Beaver
Tennessee	
Alcoa	V. F. Goddard
Athens	J. C. Ridenour
Bristol	Ralph B. Rubins
Chattanooga	W. T. Robinson
Clarksville	C. H. Moore
Cleveland	R. T. Allen
Columbia	R. L. Harris
Dyersburg	C. M. Walker
Elizabethton	Ernest H. Cox
Greenville	S. T. Gass
Jackson	C. B. Ijams
Johnson City	C. E. Rogers
Kingsport	R. N. Robinson
Knoxville	Harry Clark
Memphis	R. L. Jones
Morristown	Carl T. Vance
Murfreesboro	J. C. Mitchell
Nashville	H. F. Srygley
Paris	H. L. Smith
Shelbyville	O. E. Ratcliffe
Springfield	Wilbur S. Young
Union City	J. T. Webb
Texas	
Abilene	R. D. Green
Amarillo	W. A. McIntosh
Austin	A. N. McCallum
Beaumont	M. E. Moore
Big Spring	W. C. Blankenship
Bonham	H. A. Glass
Borger	Dan Baker
Breckenridge	H. S. Holland
Brenham	M. B. Holleman
Brownsville	G. W. Gotke
Brownwood	E. J. Woodward
Bryan	Harry L. Durham
Childress	A. W. Adams
Cisco	R. N. Cluck
Cleburne	Emmett Brown
Coleman	C. H. Hufford
Corpus Christi	Mary Carroll
Corsicana	W. H. Norwood
Dallas	N. R. Crozier
Del Rio	Roy M. Andrewa
Denison	F. B. Hughes
Denton	W. T. Daggett
Eagle Pass	B. H. Miller
Electra	B. M. Dinsmore
El Paso	A. H. Hughey
Ennis	Newton W. McCann
Fort Worth	W. M. Green
Gainesville	H. O. McCain
Galveston	E. G. Littlejohn
Goose Creek	W. R. Smith
Greenville	L. C. Gee
Harlingen	J. P. Buck
Highland Park	H. E. Gable
Hillsboro	Loy W. Hartsfield
Houston	E. E. Oberholtzer
Huntsville	.....
Jacksonville	Larue Cox
Kingsville	J. D. Bramlette
Laredo	W. P. Galligan
Longview	Henry L. Foster
Lubbock	M. H. Duncan
Lufkin	I. A. Coston
Luling	R. A. Box
Marlin	H. J. McIlhany
Marshall	E. C. Deering
McAllen	John H. Gregory
McKinney	Jack R. Ryan
Mercedes	Ernest H. Poteet
Mexia	R. M. Hawkins
Midland	W. W. Lackey
Mineral Wells	R. H. Brannan
Mission	S. L. Hardin
Nacogdoches	Rufus E. Price
Navasota	L. G. Andrews
New Braunfels	E. A. Sahm
Orange	E. B. Slover
Palestine	Bonner Frizzell

City	Superintendent
Pampa	R. B. Fisher
Paris	A. H. Chamness
Plainview	C. E. Davis
Port Arthur	G. M. Simms
Ranger	R. F. Holloway
San Angelo	Felix E. Smith
San Antonio	J. C. Cochran
San Benito	Thomas J. Yoe
San Marcos	L. J. Berry
Seguin	Joe F. Saegert
Sherman	L. T. Cook
Sulphur Springs	W. L. Willis
Sweetwater	B. H. McLain
Taylor	R. H. Brister
Temple	L. C. Procter
Terrell	J. E. Langwith
Texarkana	H. W. Stilwell
Tyler	J. M. Hodges
Uvalde	Guy D. Dean
Vernon	W. T. Lofland
Victoria	V. L. Griffin
Waco	B. B. Cobb
Waxahachie	G. B. Winn
Wichita Falls	H. D. Fillers
Yoakum	L. B. McGuffin
Utah	
Brigham	C. H. Skidmore(a)
Logan	Louis A. Petersen
Murray	E. Allen Bateman
Ogden	W. Karl Hopkins
Provo	Aldous Dixon
Salt Lake City	George N. Child
Tooele	P. M. Nielsen(a)
Vermont	
Barre	Carroll H. White
Bennington	D. W. McClelland
Brattleboro	Florence M. Wellman
Burlington	Lyman C. Hunt
Montpelier	W. A. Kincaid
Newport	E. A. Hamilton
Rockingham	F. M. Malcolm
Rutland	W. W. Fairchild
St. Albans	Josiah S. McCann
St. Johnsbury	S. C. Harding
Winooski	G. R. Stackpole
Virginia	
Alexandria	R. C. Bowton
Bluefield	A. S. Greever(d)
Bristol	Roy B. Bowers
Charlottesville	James G. Johnson
Clifton Forge	Herman Blankinship
Covington	J. G. Jeter(d)
Danville	G. L. H. Johnson
Fredericksburg	G. H. Brown
Hampton	Robert M. Newton
Harrisonburg	W. H. Keister
Hopewell	R. W. Copeland
Lynchburg	.....
Martinsville	B. Clifford Goode(d)
Newport News	J. H. Saunders
Norfolk	C. W. Mason
Petersburg	Henry G. Ellis
Portsmouth	Harry A. Hunt
Pulaski	E. L. Darst(d)
Radford	W. K. Barnett
Richmond	Albert H. Hill
Roanoke	D. E. McQuilkin
South Norfolk	R. H. Pride
Staunton	L. F. Shelburne
Suffolk	John E. Martin
Winchester	G. R. Quarles
Waynesboro	F. M. Somerville
Washington	
Aberdeen	C. J. Powell
Anacortes	G. W. Greene
Bellingham	D. E. Wiedman
Bremerton	Tillman Peterson
Centralia	John W. Goddard
Everett	R. E. Cook
Hoquiam	H. C. Crumpacker
Kelso	C. H. Lillie
Longview	E. J. McNamara
Olympia	L. P. Brown
Port Angeles	H. G. Hanbloom
Puyallup	P. B. Hanawalt
Seattle	Worth McClure
Spokane	O. C. Pratt
Tacoma	Elmer L. Breckner
Vancouver	De Garis Reeves
Walla Walla	W. M. Kern
Wenatchee	G. M. Warren
Yakima	A. C. Davis
West Virginia	
Beckley	H. E. Carmichael
Bluefield	Edwin C. Wade
Charleston	Fred L. Teel
Clarksburg	J. A. Jackson (city district) M. P. Boyles (coal district)
Elkins	Frank E. Arnett
Fairmont	H. E. Odgers
Grafton	H. A. Rice
Hinton	E. W. Taylor
Huntington	H. A. Wright
Keyser	J. C. Sanders
Martinsburg	L. W. Burns
Morgantown	C. E. McCorkle
Moundsville	Louis R. Potts
Parkersburg	H. W. Piggott
Princeton	F. Ray Power
Richwood	D. E. Dean
South Charleston	G. W. Goode
Welch	Roy B. Shront
Wellsburg	C. L. McMahan
Weston	John Ruskin Hall
Wheeling	D. B. Kraybill
Williamson	F. R. Hanifan
Wisconsin	
Antigo	R. E. Balliette
Appleton	Ben J. Rohan
Ashland	I. O. Hubbard
Baraboo	A. C. Kingsford
Beaver Dam	A. H. Luedka
Beloit	Frank E. Converse
Chippewa Falls	Robert F. Lohrie
Cudahy	A. L. Prodoehl
De Pere	T. J. McGlynn
Eau Claire	P. G. W. Keller
Fond du Lac	L. P. Goodrich
Fort Atkinson	Frank C. Bray
Green Bay	H. F. Sutton
Janesville	L. R. Creutz
Kaukauna	J. F. Cavanaugh
Kenosha	G. F. Loomis
La Crosse	G. M. Wiley
Madison	R. W. Bardwell
Manitowoc	Hugh S. Bonar
Marinette	C. E. Hulten
Marshfield	R. F. Lewis
Menasha	J. E. Kitowski
Menomonie	W. G. Ballentine
Merrill	George F. Brooks
Milwaukee	M. C. Potter
Monroe	E. O. Evans
Neenah	C. F. Hedges
Oconto	William C. Hansen
Oshkosh	Charles C. Bishop
Portage	A. J. Henkel
Racine	F. M. Longanecker
Rhinelander	W. F. Kruschke
Rice Lake	E. C. Hirsch
Sheboygan	Henry W. Kircher
Shorewood	H. S. Hemenway
South Milwaukee	Henry E. Smith
Stevens Point	P. M. Vincent
Superior	W. R. Davies
Two Rivers	Fred G. Bishop
Watertown	R. A. Buell
Waukesha	G. O. Banting
Waupun	H. C. Wegner
Wausau	S. B. Tobey
Wauwatosa	W. T. Darling
West Allis	T. J. Jones
Whitefish Bay	C. L. Mulrine
Wisconsin Rapids	A. R. Page
Wyoming	
Casper	R. S. Hicks
Cheyenne	A. S. Jessup
Laramie	A. A. Slade
Rock Springs	E. M. Thompson
Sheridan	J. J. Early

REFERENCES

(a) County superintendent.
(b) Parish superintendent.
(c) Acting.
(d) Division superintendent.

Section XI

AIDS AVAILABLE TO LOCAL SCHOOL BOARDS FROM STATE DEPARTMENTS

Participation of State Agencies in Planning and Supervising Local School-Building Development

IN the planning of buildings for a public school system, it frequently is desirable to know the degree to which the state board of education has provided for participation and cooperation. The following summary segregates the character of the supervision given by the state and its representative agencies under three headings. The first item indicates the action which the state board may be expected to take. The second item shows the part played by the state superintendent of schools as the official spokesman for the state department of education. In the third part will be found indications of the assistance or guidance which other state agencies will give. The form of tabulation has necessitated the abbreviation of the statements covering these responsibilities, but the degree and character of participation are clearly shown in each state. The list has been revised up to April, 1932.

ABBREVIATED STATEMENT OF STATES' PARTICIPATION IN SCHOOL-BUILDING CONSTRUCTION

ALABAMA

State Board of Education, Montgomery
Approves rules and regulations for the hygienic, sanitary, and protective construction of school buildings.
State Superintendent, Dr. A. F. Harman
Prepares and submits to state board rules and regulations for hygienic, sanitary, and protective construction of school buildings.
The division of schoolhouse planning prepares plans and specifications for the erection and repairs of rural school buildings, and supervises the construction of state-owned buildings.
Director of Schoolhouse Planning, R. E. Ledbetter

ARIZONA

State Board of Education, Phoenix
No jurisdiction whatever in regard to buildings erected by districts.
State Superintendent, Dr. C. O. Case
Other Agencies
Board of health issues regulations.

ARKANSAS

State Board of Education, Little Rock
Has a division of school grounds and schoolhouse planning.
Director prepares plans for 1- to 7-teacher buildings, and for such buildings as teachers' homes, shops, home economics buildings, gymnasiums, etc.
Furnishes preliminary sketches of floor plans for larger buildings.
Checks architects' plans for school buildings upon request.
Advises school officials as to plans for remodeling, repairing and altering school buildings.
Advises superintendents and teachers as to interior arrangements, furniture and equipment.
Superintends the construction of all school buildings during progress of erection.

State Superintendent, C. M. Hirst
No legal provision for approval.
Director, School Plant Division, J. Odell Baker

CALIFORNIA

State Superintendent of Public Instruction, Vierling Kersey, Sacramento
Division of schoolhouse planning passes on all plans costing more than $5,000, excepting those in the largest cities; is called into consultation by city districts, and controls other situations by surveys.
Site sizes and locations controlled by state standards.
No building contract legal without department's approval.
This department does not make working drawings.
Chief of Division of Schoolhouse Planning, Andrew P. Hill, Jr.

COLORADO

State Superintendent of Public Instruction, Mrs. Inez Johnson Lewis
School building handled by local boards of education.

CONNECTICUT

State Board of Education, Hartford
Has a bureau of building construction and maintenance which approves plans. Chief inspects school buildings for safety.
Publishes standards for guidance of local boards.
Has consulting architect to whom plans are referred.
Assists local communities in building surveys.
State Commissioner, E. W. Butterfield

DELAWARE

State Board of Education, Dover
Outside Wilmington prepares a tentative program of school building to submit to local boards.
Hears comments and suggestions thereon.
Creates standards with effect of law, governing hygienic, sanitary, and protective construction; selection, arrangement, and maintenance of sites; condemns school buildings.
Has approval of plans and specifications.
State Superintendent, Dr. H. V. Holloway
Other Agencies
Legislature has created a state school-building act.
There is a state school-building account.
State school-building commission for each district.
Plans approved by state board of education and commission.
Buildings built by commission.
Construction supervised by commission.
Board of health has to approve drinking water and sewage disposal.

DISTRICT OF COLUMBIA

Superintendent of Schools, Frank W. Ballou, Washington
Local Board of Education passes on all plans for school buildings. These plans are submitted by the office of the Municipal Architect.
First Assistant Superintendent Crane is in charge of business affairs. This officer consults with the office of the Municipal Architect on matters pertaining to plans for buildings and improvement of grounds. He also advises with school officials and submits written reports to the Committee on Buildings, Grounds and Equipment of the Board of Education. This officer inspects all school buildings and is in charge of repairs and improvements. He is the liaison officer between the schools and the municipal government in matters pertaining to the physical welfare of the schools.

Other Agencies
The Health Officer of the District of Columbia issues reports on the sanitary inspection of buildings.
Representatives of the Fire Department of the District of Columbia visit the school buildings regularly for the protection of the schools.
Municipal Architect, Albert L. Harris

FLORIDA

State Superintendent of Public Instruction, Dr. W. S. Cawthon, Tallahassee
Has oversight, charge, and management of all matters pertaining to public schools, school buildings and grounds.

GEORGIA

State Superintendent of Schools, Dr. Mell L. Duggan, Atlanta
Furnishes plans and specifications for school-building guidance in local units.
Supervisor of schoolhouse construction prepares plans for 1- to 6-teacher buildings prepares school ground plans; checks architect's plans; advises school officials.
Other Agencies
County superintendent and county board of education approve plans.
Supervisor of Schoolhouse Planning, J. L. Graham

IDAHO

State Board of Education, Boise
Standardization of:
Sanitary appliances
School furniture
School equipment and supplies
School buildings
Issues plans for 1-, 2-, 3-room buildings.
Requires approval of all plans.
State Commissioner, Dr. W. D. Vincent
Other Agencies
Department of public welfare has to cooperate with state board of education in its duties regarding schools.
County superintendent has power to require local trustees to conform to rules of state board "if there is money enough."
County board of health is responsible for sanitation in schools.

ILLINOIS

State Superintendent of Public Instruction, Dr. Francis G. Blair, Springfield
Prepares, with advice of state board of health, state architect, and state fire marshal, specifications for minimum requirements in heating, ventilation, lighting, seating, water-supply, toilets, safety against fire.
These have force of law.
Other Agencies
State architect is required to assist the state superintendent of schools.
Enforcement of law is in the hands of county superintendents and local authorities.
County superintendent approves plans according to standards of state board.
Advises school officials in details of construction, but only on standards is it necessary to follow him.
County superintendent inspects buildings.
Board of education required to submit plans to county superintendent.

INDIANA

State Superintendent of Public Instruction, George C. Cole, Indianapolis
Other Agencies
Local school trustees erect buildings. Plans and specifications must be submitted to state board of health for approval of sanitation and hygiene; to state board of accounts for adequacy of specifications and fair competition.
State board of health issues standards.

IOWA

State Superintendent of Public Instruction, Dr. Agnes Samuelson, Des Moines
Shall prepare and publish, when deemed necessary, a pamphlet containing suitable plans and specifications.

KANSAS

State Board of Education, Topeka
"No provision in the laws to prevent the erection of undesirable buildings or to compel the discontinuance of buildings that should be abolished immediately, further than plans for all new school buildings must be submitted to the state architect as to provision for fire protection according to law." Section 421, Revised School Laws of Kansas for 1931.
Has adopted standardization of rural schools involving among other things: out-building; school-building equipment; and the school building itself.
State Superintendent, George A. Allen, Jr.
Criticizes and approves plans submitted voluntarily by local authorities.
State Architect, J. W. Radotinsky

KENTUCKY

State Board of Education, Frankfort
Authorized to approve and adopt regulations for the sanitary and protective construction of public school buildings.
State Superintendent of Public Instruction, James H. Richmond
With concurrence of state board of health prepares regulations for the sanitary and protective construction of public school buildings. Prepares plans and specifications for 1- to 4-teacher public school buildings, for adoption by the state board of education. Examines and approves or disapproves plans and specifications submitted by county boards of education and graded boards of education.
Director of School Buildings and Grounds, J. W. Brooker

LOUISIANA

State Superintendent of Education, Dr. T. H. Harris, Baton Rouge
Approves plans which board of health regulations require submitting to him.
Other Agencies
Board of health regulations require submittal of plans to:
Parish superintendent of schools
State superintendent of schools
Parish health officer
for hygienic or necessary provision for ventilation, heating, light, fire protection.

MAINE

State Commissioner of Education, Bertram E. Packard, Augusta
No school building can be built or repaired without his approval.
Provides plans for 1- to 4-room buildings free of cost.
Issues minimum requirements so that local units will be able to meet his approval of plans.
Other Agencies
No school building can be built or repaired without approval of board of health.

MARYLAND

State Board of Education, Baltimore
Elementary schools. Standardization includes grounds, buildings, lighting, heating and ventilation, library, equipment.
Has issued "Standards for School Buildings" as a guide to county superintendents.
State Superintendent, Dr. Albert S. Cook
Sites and plans must be submitted to him for approval; additions to buildings also.
After plans have been approved by the state consultant architect, the state superintendent issues certificate without which no building can be erected (except Sec. 20, Chap. 506, 1916).
Other Agencies
Plans must be submitted to state board of health for approval of sewage-disposal arrangements and plumbing.

MASSACHUSETTS

State Commissioner of Education, Dr. Payson Smith, Boston
Assistants of superintendent do much in consulting with local committees. Loan slides.
Other Agencies
Department of public safety must approve all plans.
Department of public safety issues regulations.

MICHIGAN

State Department of Public Instruction, Lansing
Must approve all plans and specifications for new school buildings, additions to school buildings, or the remodeling of old school buildings.
Has issued standards.
Makes surveys, free of cost, of local situations before local board has decided what program should be, upon invitation.
Provides complete plans and specifications free of charge for all 1- and 2-room buildings.
State Superintendent, Dr. Webster H. Pearce
Has authority to inspect and condemn.

MINNESOTA

State Board of Education, St. Paul
State aid for building of consolidated schools.
Prescribes rules for schoolhouse construction, including therein rules of the board of health relative to sanitary standards for toilets, water-supply, and disposal of sewage.

State Commissioner, James M. McConnell
Examines all plans and specifications with power of approval or otherwise.
He may condemn buildings under his own or the state board of education's rules.
Other Agencies
The law authorizes county superintendent to advise local school boards in regard to buildings and ventilation, but, as a matter of fact, the county superintendent does not exercise this power. All such questions come to commissioner of education.
Director, Division of Buildings and Sanitation, Samuel A. Challman

MISSISSIPPI

State Department of Education, Jackson
Has a division of school building service. This division:
Cooperates in making surveys on the effective organization of schools.
Makes surveys to determine building needs.
Outlines building programs.
Approves architects' plans and specifications for school buildings.
Furnishes free plans and specifications for some small school buildings, teachers' homes and accessory buildings.
General advisory service on school-plant planning and equipment and on the effective use of the school plant.
State Superintendent, Dr. W. F. Bond

MISSOURI

State Department of Education, Jefferson City
The state is a member of the National Council of Schoolhouse Construction. Blueprints, plans and specifications are furnished free of charge by the Department, through its connection with the National Council of Schoolhouse Construction. This work is only advisory.
Supervisor of Schoolhouse Construction, N. E. Viles
Advises with school boards concerning the construction of the proper type of school buildings.
State Superintendent, Charles A. Lee

MONTANA

State Board of Education, Helena
Publishes a bulletin on 1- and 2-room rural buildings, containing drawings and plans.
State Superintendent, Dr. Elizabeth Ireland
Plans are furnished local boards by the board of health.

NEBRASKA

State Superintendent of Public Instruction, Charles W. Taylor, Lincoln

NEVADA

State Department of Education, Carson City
Deputy superintendent has authority to check plans for all school buildings.
State Superintendent of Public Instruction, Walter W. Anderson

NEW HAMPSHIRE

State Board of Education, Concord
State Commissioner, James N. Pringle
Interprets meaning of "suitable and sanitary" buildings for all schools. Has general authority to make regulations. Cooperates with superintendents and local school boards in planning buildings.
Recommends to state board of health investigation of unsuitable buildings.
Other Agencies
State board of health, on complaint, may condemn or order buildings improved at expense of districts.

NEW JERSEY

State Board of Education, Trenton
Advice and consent to appointment of building inspector by Commissioner of Education.
Approves plans which must be submitted.
Has set up a code.
State Department of Education
Has a business division with superintendent and director of school buildings.
State Commissioner, Dr. Charles H. Elliott
May instruct county and city superintendents as to constructing schoolhouses and furnishing them.
Appoints an inspector of buildings, with advice and consent of State Board of Education.
Other Agencies
County superintendent has power "to note" conditions of schoolhouses, sites, etc., and advise with local boards in respect to construction, heating and ventilation, and lighting.
Local boards provide school buildings.
Commissioner of charities and corrections shall examine and report on school buildings at request of commissioner of education.
Inspector of School Buildings, Walter W. Sharpley

NEW MEXICO

State Superintendent of Public Instruction, Mrs. Georgia Lusk, Santa Fe

NEW YORK

State Education Department, Albany
Has a division of school buildings and grounds with a director.
Has set up standards.
Board issues a pamphlet of information for local authorities.
Makes inspections of sites and school conditions before definite action is taken by local authority.
Advises with superintendent, principals, and boards in regard to needs and best way to meet them.
Examines preliminary plans.
State Commissioner, Dr. Frank P. Graves
All plans and specifications must receive the commissioner's approval in all districts other than first and second class cities.
He cannot approve unless plans conform to laws.
No tax can be levied until plans are approved.
Director of School Buildings and Grounds Division, Joseph H. Hixson

NORTH CAROLINA

State Board of Public Instruction, Raleigh
There is a literacy loan fund from which loans are made when plans are approved.
State department has a set of standards.
Has plans purchased from architects which it distributes free.
State Superintendent, Dr. A. T. Allen
All plans must be submitted to state superintendent for approval, except in special charter schools.
Other Agencies
Plans must also be submitted to insurance commission for approval, also to state board of health.

NORTH DAKOTA

State Superintendent of Public Instruction, Bertha R. Palmer, Bismarck
Plans must be submitted to and approved by superintendent.

OHIO

State Director of Education, B. O. Skinner
Other Agencies
Has a state building code (very elaborate).
All plans must be approved by chief inspector of workshops and factories, except in cities having regularly organized building inspection departments.
District health commissioner checks plans for water-supply and sanitary arrangements. State department of health may make surveys and issue orders as to these matters.

OKLAHOMA

State Superintendent of Public Instruction, John Vaughan, Oklahoma City
Prepares complete plans and specifications for the construction of all school buildings for four teachers or less, costing less than $10,000.
Makes school-building survey for all sizes of buildings.
Approves plans of all sizes, but approval is not required by law.
Other Agencies
Standard building laws.
Book of 300 plans in hands of each county superintendent in the state.
Director of Schoolhouse Planning, Haskell Pruett

OREGON

State Superintendent of Public Instruction, C. A. Howard, Salem
Issues booklet giving suggested plans for 1-, 2-, and 3-room school buildings. No legal provision for the approval of the state department.
Other Agencies
Plans for 1-room schools must be approved by county school superintendents.
County superintendents advise with the school boards relative to the construction, warming, ventilating, and arrangement of schoolhouses.

PENNSYLVANIA

State Department of Public Instruction, Harrisburg
Has a director of division of school buildings.
Prescribes rules and regulations and has power to take such action as it may deem expedient to promote physical and moral welfare of school children.

Department code—
Required to approve plans in 2nd, 3rd, 4th class districts.
Supervises preparation of plans in local communities if asked to do so.
Submits, if asked, suggestive sketches.
State Superintendent, Dr. James N. Rule
Other Agencies
State code.
Art commission passes on architectural design.
Department of labor and industry passes on fire and panic protection.
Director, Division of School Buildings, HuBert C. Eicher

RHODE ISLAND

State Commissioner of Education, Dr. Walter E. Ranger, Providence
Commissioner has printed pictures and plans in his annual report.
Part of the income of the permanent school fund may be apportioned by the State Board of Education to assist towns in constructing model school buildings.

SOUTH CAROLINA

State Superintendent of Education, Dr. James H. Hope, Columbia
Division of schoolhouse planning and construction. Plans must be submitted to and approved by the director of schoolhouse planning.
The director inspects all plans and new buildings, and a certificate of approval is necessary before they can be used.
Plans and specifications and supervision of construction are furnished to small schools not employing an architect.
Other Agencies
Has a state building code.
Director of Schoolhouse Planning, S. P. Clemons

SOUTH DAKOTA

State Superintendent of Public Instruction, E. C. Giffen, Pierre
Plans must be approved by him, and show heating and ventilation scheme. He assists in an advisory capacity in the planning of school buildings; he also helps boards in various ways to show their communities the needs of new buildings and additions to buildings.

TENNESSEE

State Commissioner of Education, P. L. Harned, Nashville
Division of Schoolhouse Planning and Construction furnishes plans to boards desiring to build.

TEXAS

State Department of Education, Austin
Special state aid fund.
State Superintendent, C. N. Shaver
Other Agencies
School-building code.
Plans must be submitted as follows for approval: (1) in a common school district—to the county superintendent; (2) independent district and city or town—to superintendent of schools.
These agencies report to state department what they have done and transmit evidence.
State Director of School Plant Division, J. Fred Horn
Prepares plans for 1- to 6-teacher buildings, and suggestive sketches for larger buildings; advises school officials; checks architects' plans; makes school-building surveys upon invitation; visits local units upon invitation.

UTAH

Conditions reported uncertain
State Board of Education, Salt Lake City
There are two department building codes.
First is in abeyance though not exactly discarded.
They have operated under the second one 5 years.
State Superintendent, Dr. C. N. Jensen
Is required to formulate a code to govern preparation of plans by local communities.
May hire an architect to examine plans or inspect buildings.

VERMONT

State Board of Education, Montpelier
Public school buildings are standardized with "points" on buildings, grounds, equipment.
Plans "should be" submitted to state board.
Issues plans, pictures and bulletins.
State Commissioner, Francis L. Bailey
Other Agencies
Plans "must be" submitted to board of health.

VIRGINIA

State Board of Education, Richmond
Has a division of school buildings.
Prepares plans and specifications for smaller towns and cities.
Supervises construction free of charge.
Minimum standards have been set up and approved.
Cooperates with local boards in:
(a) Preparing preliminary plans.
(b) Getting out final plans.
(c) Attendance at opening of proposals.
(d) Inspection every 2 weeks during construction, additional upon request of contractor or local board.
State Superintendent, Dr. Sidney B. Hall
State Director, Division of Buildings, Raymond V. Long

WASHINGTON

State Board of Education, Olympia
Has been given "some power" through law on "wider use of school plant."
State Superintendent, Dr. N. D. Showalter
Other Agencies
County superintendents approve plans in 2nd and 3rd class districts.

WEST VIRGINIA

State Board of Education, Charleston
In districts with population less than 5,000, plans must be submitted for approval to board or its agent.
State Superintendent of Free Schools, William C. Cook

WISCONSIN

State Department of Public Instruction, Madison
Under a cooperative agreement between the industrial commission and the department, all school plans are sent to the latter by the commission for checking and suggestive criticisms looking towards the erection of first class buildings.
Helps local communities by making suggestive plans for all types of buildings to serve as a basis for extended work by commercial architects.
Service has been extended to cover expert advice on heating, ventilation, lighting.
The department develops complete plans and specifications and gives architectural service for 1- and 2-room rural schools on request.
Inspects all types of schools with a view to improving housing conditions and facilities; makes complete building surveys in all types of communities on request.
State Superintendent, John Callahan
Other Agencies
The law requires submission of all school plans to industrial commission. This checking refers primarily to the application of the state building code and pays attention primarily to construction, safety and sanitation.
Supervisor of Buildings, H. W. Schmidt

WYOMING

State Board of Education, Cheyenne
Prescribes standards which may include rules and regulations for the sanitary and hygienic construction of schoolhouses and the location and selection of grounds.
State Superintendent, Mrs. Katharine A. Morton

Section XII

ARCHITECTS
FOR EDUCATIONAL BUILDINGS

The following directory is restricted to architects who, since January 1, 1925, have designed three or more school or college buildings costing over $50,000 *each.*

Many of these architects have, of course, handled during this period a much larger amount of work in the educational field than that shown. Space limitations, however, have necessitated the restricting of each architect to three listings, and the buildings mentioned are regarded as typical examples of the architects' recent work.

No attempt has been made to evaluate the skill or professional standing of the architects listed. Boards of Education and persons interested in the construction of new buildings can obtain valuable advice in this matter from the presidents of the local chapters of the American Institute of Architects, or from the national headquarters of that organization, The Octagon, Washington, D. C., and from such sources as the National Advisory Council on School Buildings, the United States Office of Education, the respective state departments of education, the Department of Education of the National Catholic Welfare Conference, and the Department of Educational Administration of Teachers College, Columbia University, New York.

The 48 states are arranged in alphabetical order, followed by the Canadian provinces in alphabetical order. Under each state and province the sequence is not by cities, but by architects' names in alphabetical order for the entire state or province.

ALABAMA

Fredrick Ausfeld, Montgomery
Sidney Lanier High School, Montgomery
Gymnasium Building, Montgomery
Junior High School, Montgomery

Denham & Denham, Birmingham
Fairfield High School, Fairfield
Ensley-Howard High School, Ensley (affiliated with Howard College, Birmingham)
Mountain Brook Elementary School, Jefferson County

Miller & Martin, Architects; **J. A. Lewis,** Engineer, Inc., Birmingham
Group of six buildings for the University of Alabama, Tuscaloosa
Group of three buildings for Birmingham-Southern College, Birmingham
Two school buildings for Board of Education, Birmingham

Bem Price, Birmingham
Tupelo High School, Tupelo, Miss.
Minor High School, Jefferson County
Dormitory, Athens College, Athens

W. A. Rayfield & Co., Birmingham
National Training School for Girls, Washington, D. C.
Banks School of Music, Birmingham
Alabama Association for the Blind, Birmingham.

George B. Rogers, Mobile
High School, Mobile
High School, Mobile
Library, Spring Hill College, Mobile

Matthews H. Tardy, Birmingham
Roanoke Senior High School, Roanoke, Va.
Roanoke Junior High School, Roanoke, Va.
Consolidated School, Rockymount, Va.

Warren, Knight & Davis, Birmingham
Group of nine buildings, Alabama Polytechnic Institute, Auburn
Group of seven buildings, Alabama College, Montevallo
Physical Education Building, Murphy High School, Mobile

Wm. Leslie Welton, Birmingham
Gorgas School, Birmingham
Robinson School, Birmingham
Athenaeum, Parochial School, Birmingham

ALASKA

N. Lester Troast, Juneau
Sage Memorial Building, Sheldon Jackson School, Sitka
Shoemaker Bay Industrial School, Wrangell
Col. Carl Ben Eielson Building of Aeronautical Engineering, Fairbanks

ARIZONA

Fitzhugh & Byron, Phoenix
Phoenix Junior College, Phoenix
Clarkdale High School, Clarkdale
Library Building, State Teachers College, Flagstaff

Lescher & Mahoney, Phoenix
Training School, Arizona State Teachers College, Temple
Stadium, Phoenix Union High School, Phoenix
John Greenleaf Whittier Grade School, Phoenix

Roy Place, Tucson
University of Arizona Group, Tucson
High School, Tucson
Grade School, Tucson

Trost & Trost, Phoenix (also El Paso, Texas)
Loretta College, El Paso, Texas
Library, Sul Ross Teachers College, Alpine, Texas
Winslow High School, Winslow

V. O. Wallingford, Phoenix
James Russell Lowell Public School, Phoenix
Emerson School, Third Unit, Phoenix
Bishop Atwood Memorial Church School, Phoenix

ARKANSAS

John Parks Almand, Little Rock
Morrilton High School, Morrilton
Russelville High School, Russellville
Bentonville High School, Bentonville

James Dinwiddie, Fayetteville
Junior-Senior High School, Springdale
Junior-Senior High School, Gentry
Junior-Senior High School, Winslow

Haralson & Nelson, Fort Smith
North Washington Grade School, Fayetteville
South Jefferson Grade School, Fayetteville
High School, Booneville

George R. Mann, Wanger & King, Little Rock
North Little Rock High School, North Little Rock
Hickory Street School, North Little Rock
Four rural schools, Pulaski County

Mitchell Selligman, Pine Bluff
High School, Hamburg
High School, McGehee
High School, Warren

Eugene John Stern, Little Rock
Little Rock Senior High School and Junior College, Little Rock
Pulaski Heights Grade School, Little Rock
Hot Springs Junior High School, Hot Springs

Witt, Seibert & Halsey, Texarkana (also Texarkana, Texas)
Junior College, Texarkana
High School, Texarkana
Practice Building and Library, State Teachers College, Conway

Wittenberg & De Lony, Little Rock
Dunbar High School (colored), Little Rock
Desarc High School, Desarc
Forrest City High School, Forrest City

E. J. Wolpert, Jonesboro
Woodland Junior High School, Jonesboro
Tyronza High School, Tyronza
North School, Jonesboro

CALIFORNIA

Allison & Allison, Los Angeles
Women's Physical Education Building, University of California, Los Angeles
Frances E. Willard Junior High School Group, Santa Ana
Herbert Hoover Elementary School, Santa Ana

Arthur W. Angel, Los Angeles
Auditorium Building and Intermediate School, Irvington Intermediate School, Huntington Park
Elementary School, Huntington Park

W. Horace Austin, Long Beach
Olive Avenue Junior High School, Compton
Addition to Woodrow Wilson High School, Long Beach
Addition to Long Beach Polytechnic High School, Long Beach

Edwin Bergstrom, Los Angeles
Auditorium and Administration Building, John C. Fremont High School, Los Angeles
Science and Shop Buildings, same
Boys' and Girls' Gymnasium Buildings, same

Charles H. Biggar, Bakersfield
Kern County Union High School Group
Lincoln School, Bakersfield
Conley District Schools, Taft

Horatio W. Bishop, Los Angeles
Carthay Center School, Los Angeles
Two additions, Carthay Center School, Los Angeles

Howard G. Bissell, Stockton
Auditorium and Conservatory Building, College of the Pacific, Stockton (associated with Davis-Pearce Co., Stockton)
New group of buildings, Calaveras Union High School, San Andreas

Leon Caryl Brockway, Pasadena
Jefferson Elementary School, Pasadena
Arroyo Seco School, Pasadena
Freemont School, Pasadena

Birge M. Clark, Palo Alto
Palo Alto Union High School, Palo Alto
Washington Union High School Gymnasium, Centerville
Group of buildings for Menlo School for Boys, Atherton

Orville L. Clark, Los Angeles
Paso Robles Union High School, Paso Robles
Russell Elementary School, Los Angeles
Glendale Elementary School, Glendale

W. D. Coates, Jr., Co., Fresno
Hanford Union High School, Hanford
Porterville Union High School, Porterville
Sanger Union High School, Sanger

Alfred I. Coffey, San Francisco
Gault Grammar School, Santa Cruz
Garfield School, Fair Oaks
McKinley Grammar School, Redwood City

Norman R. Coulter, San Francisco
Crescent Elk School, Crescent City
Fortuna School, Fortuna
Addition, Crescent City High School, Crescent City

Louis N. Crawford, Santa Maria
Goleta Union School, Goleta
El Camino Street School, Santa Maria
Pismo Grammar School, Pismo

Crim, Resing & M'Guinness, San Francisco
James Lick Junior High School, San Francisco
Presidio Junior High School (first unit), San Francisco
Presidio Junior High School (second unit), San Francisco

Davis-Pearce Co., Stockton
Yuba City Elementary School, Yuba City
Calistoga Elementary School, Calistoga
Antioch High School, Antioch

Charles F. Dean, Sacramento
Sacramento Junior College, Sacramento
Redding High School, Redding
Lincoln Grammar School, Sacramento

John J. Donovan, Oakland
St. Mary's College Group, Moraga
Eureka Junior High School, Eureka
College of Notre Dame, Belmont

Edwards & Schary, San Francisco
Park School, San Mateo
Borel School, San Mateo
Soledad School, Soledad

Frederick H. Eley, Santa Ana
Julia Lathrop Junior High School, Santa Ana
Gymnasium and plunge, High School, Santa Ana
Gymnasium and plunge, Junior High School, Huntington Beach, Calif.

Gable & Wyant, Los Angeles
Hawthorne Elementary School (three buildings), Beverly Hills
Beverly Vista Elementary School (four buildings), Beverly Hills

Louis J. Gill, San Diego
Scripps Institute of Oceanography Laboratory, University of California, San Diego
Bishop's School for Girls, La Jolla
La Jolla Elementary School, La Jolla

A. E. Hansen, Glendale
Montrose Grammar School, Montrose
Lincoln Grammar School, La Crescenta
La Crescenta Grammar School, La Crescenta

William C. Hays, San Francisco
Giannini Hall, University of California, Berkeley
Animal Science Building, University of California, Davis
Agricultural Engineering Building, University of California, Davis

Myron Hunt & H. C. Chambers, Los Angeles
Library, Orr Hall and Erdman Hall (women's dormitories), Students' Union and Music Building, Gymnasium and Pool, Occidental College, Eagle Rock, Los Angeles
Whittier Union High School Group, Whittier
Girls' Collegiate School, Glendora

Arthur R. Hutchason, Los Angeles
Rockdale School, Los Angeles
Preventorium School, Santa Barbara
San Luis Rey School, San Luis Rey

William Templeton Johnson, San Diego
Addition to La Jolla High School, La Jolla
Alexander Hamilton School, San Diego
Mabel Shaw Bridges Music Auditorium for Claremont Colleges, Claremont

Howard E. Jones, San Bernardino
San Bernardino Valley Junior College, San Bernardino
Woodrow Wilson School, San Bernardino
San Bernardino Junior High School, San Bernardino

Frederick Kennedy, Jr., Pasadena
Frances E. Willard School, Pasadena
Woodrow Wilson Junior High School, Pasadena
Astronomy Building, Pasadena Junior College, Pasadena

T. C. Kistner & Co., Los Angeles
John C. Fremont Junior High School, Pomona
Herbert Hoover High School, San Diego
Leuzinger High School, Lawndale

Krempel & Erkes, Los Angeles
Bret Harte Junior High School, Los Angeles
118th Street School, Los Angeles
1st Street School Addition, Los Angeles

Ernest J. Kump Co., Fresno
Visalia Union High School, Visalia
Gymnasium, Wasco Union High School, Wasco
Auditorium, Wasco Union High School, Wasco

J. A. Larralde, Los Angeles
Mill School, near Whittier
Norwalk School, Norwalk
Wiseburn School, Hawthorne

George M. Lindsey, Los Angeles
James A. Garfield High School, Los Angeles
South Gate High School, South Gate
John Marshall High School, Los Angeles

Marsh, Smith & Powell, Los Angeles
Letters and Arts Building, University of Redlands, Redlands
Sierra Madre Elementary School, Sierra Madre
Newport Harbor Union High School, Orange County

Mott M. Marston, Los Angeles
Tustin Union High School, Tustin
Gymnasium, Puente Union High School, Puente
Lockwood Street School, Los Angeles

Marston & Maybury, Pasadena
Charles W. Eliot Junior High School, Pasadena
Infirmary, Claremont College, Claremont
Mechanic Arts Building, University of California, Los Angeles

Albert C. Martin, Los Angeles
Conaty Memorial High School, Los Angeles
Narbonne High School of Los Angeles group
Los Angeles Junior Seminary, Los Angeles

Miller & Pflueger, San Francisco
Jefferson Elementary School, San Francisco
Alamo Elementary School, San Francisco
Roosevelt Junior High School, San Francisco

Miller & Warnecke, Oakland
Castlemont Senior High School, Oakland
Merritt High School, Oakland
Garfield Junior High School, Oakland

DeWitt Mitcham, San Bernardino
Thomas Jefferson Elementary School, San Bernardino
San Bernardino Valley Junior College Gymnasium, San Bernardino
D Street Elementary School, Needles

Morgan, Walls & Clements, Los Angeles
Chouinard School of Art, Los Angeles
Auditorium Unit, Polytechnic High School, Los Angeles
Rosemead Grammar School, Rosemead

Karl W. Muck, County Architect, Los Angeles
Juvenile Hall School (for delinquent minors), Los Angeles
El Retiro School (Girls' Rehabilitation School), San Fernando
Occupational Therapy School (for consumptive children), Olive View

James T. Narbett, Richmond
Roosevelt Junior High School, Richmond
Fairmont Grade School, Richmond
Woodrow Wilson Grade School, Richmond

H. C. Newton & R. D. Murray, Los Angeles
St. John's School, Hawthorn
St. Joseph's School, Inglewood
Lankershim School, Los Angeles

A. S. Nibecker, Jr., South Pasadena
Auditorium, University High School, Sawtelle
Gymnasium, Foshay Junior High School, Los Angeles
Havenhurst Elementary School, San Fernando

E. L. Norberg & John E. Norberg, San Francisco
San Mateo High School Group, San Mateo
High School Gymnasium, Burlingame
San Carlos Central School, San Carlos

John Parkinson & Donald B. Parkinson, Los Angeles
University of Southern California, Los Angeles:
Bridge Hall
Student Union Building
Physical Education Building

Pierpont & Walter S. Davis, Los Angeles
Sierra Park School, Los Angeles
Stanford Avenue School, Los Angeles
Palo Verde School, Los Angeles

Roy Seldon Price, Beverly Hills
Horace Mann School, Beverly Hills
Boynton School, Boynton, Ark.
Lenox Hall additions, St. Louis, Mo.

Scott Quintin, Alhambra
Woodrow Wilson School, San Gabriel
Auditorium, Granada School, Alhambra
Auditorium, Fremont School, Alhambra

Lloyd Rally, Los Angeles
Fremont Avenue Elementary School, Los Angeles
Boys' Gymnasium, Whittier Union High School, Whittier
Classroom Building, Whittier Union High School, Whittier

W. H. Ratcliff, Jr., Berkeley
New group of buildings, Mills College, Oakland (also, general scheme for future development)
New group of buildings, Pacific School of Religion (also, general scheme for future development)
Hillside School, Berkeley

Alfred W. Rea & Charles E. Garstang, Los Angeles
Group of buildings for El Segundo High School, El Segundo
Chemewa Junior High School, Riverside
Polytechnic High School Gymnasium, Riverside

Reed & Corlett, Oakland
Chabot Grammar School, Oakland
Additions to Dixon Grammar School, Dixon
Oakland High School, Oakland

Winchton Leamon Risley, Los Angeles
Norfolk Street Grammar School, Los Angeles
Dominguez School, Los Angeles
Dickens Street School, Los Angeles

Lincoln Rogers & Anson Boyd, Los Angeles
Auditorium, High School, San Diego
Auditorium, LaFayette Junior High School, Los Angeles
Part-Time High School, San Diego

Francis W. Rutherford, Santa Monica
Madison (platoon) School, Santa Monica
Valley Junior High School, Burbank
Emerson Elementary School, Burbank

Frank R. Schaefer, Los Angeles
Auditorium Building, Franklin High School, Los Angeles
Winter Gardens School, Montebello
Lowell Joint School, Los Angeles and Orange Counties

George C. Sellon, Sacramento
Colusa Union High School, Colusa
Loomis Union Grammar School, Loomis
Benicia High, Benicia

Shields, Fisher & Lake, Fresno
Roosevelt High School, Fresno
Addition to Hanford High School, Hanford
Benjamin Franklin School, Fresno

Henry C. Smith, San Francisco
Hayward Union High School Group, Hayward
Gonzales Union Grammar School, Gonzales

Windsor Soule & John Frederick Murphy, Santa Barbara
McKinley Elementary School, Santa Barbara
Harding Kindergarten-Primary School, Santa Barbara
Frederick-Forrest Peabody Elementary School, Santa Barbara

Starks and Flanders, Sacramento
Davis Joint Union High School, Davis
Williams Union Grammar School, Williams
Crocker Elementary Grade School, Sacramento

Swartz & Ryland, Fresno (also Monterey)
Academic Building, Monterey Union High School District, Monterey
Heaton Elementary School, Fresno
Library, Fresno State College, Fresno

Edward Cray Taylor & Ellis Wing Taylor, Los Angeles
Cabrillo Avenue Elementary School, San Pedro
Home Gardens School, Los Angeles
Hooper Avenue Elementary School, Los Angeles

Ralph D. Taylor, Alturas
Roosevelt Elementary School, Susanville, Lassen County
High School Group, Greenville, Plumas County
Gymnasium Building, Modoc Union High School, Alturas

Walker & Eisen, Los Angeles
Thomas A. Edison Junior High School, Los Angeles
Humphreys Avenue School, Los Angeles
South Park School, Los Angeles

W. H. Weeks, San Francisco
La Cumbre Junior High School, Santa Barbara
Santa Rosa High School, Santa Rosa
Woodrow Wilson Junior High School, San Jose

G. Stanley Wilson, Riverside
Riverside Junior College, Riverside
Corona High School, Corona
Upland Junior High School, Upland

Roy C. Wilson, Santa Paula
Isbell Grammar School, Santa Paula
Ojai High School, Ojai
Hueneme Grammar School, Hueneme

Carleton Monroe Winslow, Los Angeles
Fullerton Union High School Group, Fullerton
Eagle Rock High School, Los Angeles
Knapp College of Nursing, Santa Barbara

Henry J. Withey, Los Angeles
Fries Avenue Elementary School, Wilmington
Malabar Street Elementary School, Los Angeles
Van Nuys Elementary School, Van Nuys

David J. Witmer & Loyall F. Watson, Los Angeles
Ninety-Sixth Street School, Los Angeles
Sturges Auditorium, Sturges Junior High School, San Bernardino
Ramona School, San Bernardino

Ralph Wyckoff, San Jose
Anne Darling School, San Jose
Washington School, Santa Clara
Science Building, State Teachers College, San Jose

COLORADO

J. B. Benedict, Denver
Graland Primary School, Denver
Rosedale Primary School, Denver
St. Thomas Seminary and Chapel, Denver

William N. Bowman Co., Denver
Gymnasium, State Teachers College, Greeley
Cole Junior High School, Denver
High School, Fort Collins

T. H. Buell & Co., Denver
Horace Mann Junior High School, Denver
Asbury Elementary School, Denver
High School, Ovid

Walter DeMordaunt, Pueblo
Park Hill Junior High School, Pueblo
Pleasant View High School, Pueblo
Additions to Junior High School, District No. 20, Pueblo

H. W. J. Edbrooke, Denver
Dormitory and Academic Building, Loretto Heights College, Denver
Valverde School, Denver
Arvoda High School, Arvoda

M. S. Fallis Architect Co., Denver
Garden Place School, Denver
Colorado Woman's College, Denver
Glenwood Springs High School, Glenwood Springs

William E. & Arthur A. Fisher, Denver
South High School, Denver
Morey Junior High School, Denver
Alamosa High School, Alamosa

Robert K. Fuller, Denver
Edison School, Denver
Junior High School, Boulder
Eaton High School, Eaton

Eugene G. Groves, Denver
Library, Colorado Agricultural College, Fort Collins
High School, Pine Bluffs, Wyoming
William Smith High School, Aurora

M. H. Hoyt & B. Hoyt, Denver
Lake Junior High School, Denver
Steele School, Denver
Nurses Training School, Denver

Henry James Manning, Denver
Library, Denver University, Denver
Residence Hall, Regis College, Denver
Fairmont Grade School, Denver

G. Meredith Musick
Bryant-Webster Grade School, Denver
Beach Court Grade School, Denver
Colorado State Industrial School, Golden

I. H. & W. M. Rapp Co., Trinidad
Willson Hall—Science Building for New Mexico Military Institute, Roswell, N. Mex.
Cahoon Armory for New Mexico Military Institute, Roswell, N. Mex.
Two sections of barracks, completing quadrangle, New Mexico Military Institute, Roswell, N. Mex.

E. Floyd Redding, Denver
Opportunity School (Vocational High School), Denver
High School, Nogales, Ariz.
Nurses School and Dormitory, Porter Sanitarium and Hospital, Denver.

Geo. H. Williamson, Denver
East Senior High School, Denver
William H. Smiley Junior High School, Denver
Lincoln School, Denver

CONNECTICUT

Isaac A. Allen and Son, Inc., Hartford
Colonel William E. Cone School, Hartford
Vine Street School, Hartford
Addition to Vine Street School, Hartford

Leonard Asheim, Bridgeport
Devon School, Milford
Roosevelt School (City Normal), Bridgeport
Waltersville School, Bridgeport

Russell F. Barker, Hartford
William Thompson Sedgwick School, West Hartford
Charter Oak Elementary School, West Hartford
Elmwood Elementary School, West Hartford

Fred'k H. Beckwith, Bridgeport
Central Junior High School, Norwalk
Nichols School, Stratford
Garden Street School, Stratford

Brown & Von Beren, New Haven
Fair Haven Junior High School, New Haven
Simeon Baldwin School, New Haven
Atwater Street Training School, New Haven

Walter P. Crabtree, Hartford
Lincoln Elementary School, New Britain
Vocational High School, New Britain
Bloomfield High School, Bloomfield

A. Graham Creighton, New London
Hand Academy, Madison
Charles B. Jennings Grammar School, New London
Rutland High School, Rutland, Vt.

R. W. Foote, New Haven
West Haven High School, West Haven
Branford High School, Branford
Silsbey Science Hall, Talladega, Ala.

Freney & Moeckel, Waterbury
Crosby High School, Waterbury
Bunker Hill School, Waterbury
Woodrow Wilson School, Waterbury

George H. Gray, New Haven
Berea College, Berea, Ky.
South Campus: Rogers Hall (Girls' Dormitory); Woods-Penniman Building (Women's Union)
North Campus: Emery Building (Domestic Science); Science Hall; Seabury Gymnasium for Men
East Campus: Agricultural Building

Office of Lorenzo Hamilton, Inc., Meriden
New unit, Roger Sherman School, Meriden
New unit, John Barry School, Meriden
State Trade School, Meriden

William E. Hunt, Torrington
Central Grade School, Winsted
Greenwood School, Winsted
Forbes School, Torrington

Joseph A. Jackson, New Haven
St. Stephen's School, Bridgeport
St. Hedwig's School, Floral Park, N. Y.
St. Stanislaus School, Trenton, N. J.

Wm. D. Johnson, Hartford
Francis Stillman Grammar School, Wethersfield
Holcomb Street Grammar School, Hartford
Third addition, Holcomb Street Grammar School, Hartford

Malmfeld, Adams & Prentice, Hartford
State Trade School, Hartford
West Middle School, Hartford
Noah Webster School, Hartford

William T. Marchant, Hartford
Meadow District School, East Hartford
Center School, Farmington
Ridge Road School, Wethersfield

Mylchreest & Reynolds, Hartford
Our Lady of Sorrows Parochial School, Hartford
Washington Street School, Hartford
Sigma Chi Fraternity House, Wesleyan University, Middletown

Delbert K. Perry & Earle K. Bishop, New Britain
Science Building and Pathological Laboratory, Connecticut Agricultural College, Storrs
Junior High School, Newington
Faculty House, Connecticut Agricultural College, Storrs

Ernest A. Southey, Bridgeport
Bassick Junior High School, Bridgeport
Alteration, Beardsley School, Bridgeport
Danbury High School, Danbury

Towner & Sellew Associates, Inc., Middletown
Woodrow Wilson High School, Middletown
City District High School, Middletown
Community School, Hampden, Mass.

Louis A. Walsh, Waterbury
St. Thomas Seminary, Bloomfield
Levenworth High School, Waterbury
Columbia School, Waterbury

Whiton & McMahon, Hartford
Clarence A. Barbour School, Hartford
Hillside Avenue School, Hartford
Frank A. Brackett School, Hartford

DELAWARE

Brown & Whiteside, Wilmington
Barracks Buildings and Recreation Building, Ferris Industrial School, Marshallton
Sandy Bank School, Upper Providence, Pa.

E. William Martin, Wilmington
Avongrove High School, Avondale, Pa.
Sellersville-Perkasie High School, Perkasie, Pa.
Kennett Consolidated School, Kennett Square, Pa.

DISTRICT OF COLUMBIA

Albert I. Cassell, Washington
Howard University group, Washington:
College of Medicine
Women's Dormitories (group of five buildings)

Albert L. Harris, Municipal Architect, Washington
McKinley High School, Washington
Garnet Patterson Junior High School, Washington
E. A. Paul Junior High School, Washington

H. G. Little, Washington
Grade School Group, Wauchula, Fla.
Zolfo School Group, Zolfo, Fla.
Ft. Meade High School, Ft. Meade, Fla.

Milburn-Heister & Co., Washington
Junior High School, Durham, N. C.
Parochial School, Washington
De LaSalle College, Washington

Rossel Edw. Mitchell, Washington (also Chevy Chase, Md.)
Methodist Protestant College, High Point, N. C.
High School, Bethesda, Md.
Grade School, Falls Church, Va.

M. F. Moore, Washington
St. Augustine's School, Convent, Church, Rectory Hall, Washington
Bon Secours Convent, Washington
St. Martin's School, Convent, Washington

Upham and Adams, Washington
Washington-Lee High School
Leesburg High School, Leesburg, Va.
Mt. Rainier High School, Mt. Ranier, Md.

L. P. Wheat, Jr., Washington
Several grade schools and one Junior High School for the Board of Education, Montgomery County, Md.

FLORIDA

Franklin O. Adams, Tampa
Plant High School, Tampa
Brewster Vocational School, Tampa
Henry B. Mitchell Graded School, Tampa

Roy A. Benjamin, Jacksonville
John Gorrie Junior High School, Jacksonville (Mellen C. Greeley, Associate Architect)
Kirby-Smith Junior High, Jacksonville (Mellen C. Greeley, Associate Architect)
Graded School, Jacksonville

Edward D. Fitchner, Tallahassee
St. Andrews Grade School, St. Andrews
Bay County High School, Panama City
Jackson County High School, Marianna

August Geiger, Miami
Shenandoah Junior High School, Miami
Robert E. Lee Auditorium, Miami
Ojus School, Ojus

Mellen C. Greeley, Jacksonville
John Gorrie and Edmund Kirby Smith Junior High School Annex buildings, Jacksonville
Madison High School, Madison
Greenville High School, Greenville

Harry M. Griffin, Daytona Beach
Junior-Senior High School, Daytona Beach
Junior-Senior High School, Leesburg
Junior-Senior High School, Titusville

Arch D. Holsinger, Lakeland
Grammar School, Haines City
Highlands City School, Highlands City
Griffin School, Griffin

Bert D. Keck, Stuart
Stuart High and Grade School, Stuart
Indiantown Grade School, Indiantown
Salemo Grade School, Salemo

Francis J. Kennard & Son, Tampa
Hillsborough High School, Tampa
Memorial Junior High School, Tampa
West Tampa Junior High School, Tampa

Kiehnel & Elliott, Miami
Rollings College, Winter Park
Morningside Elementary School, Miami
Miami Senior High School, Miami

Maurice E. Kressly, Orland
Greensburg Junior-Senior High School, Greensburg, Pa.
Lincoln High School, Ridgeway, Pa.
St. James' Roman Catholic Parish School, Orlando

Mark & Sheftall, Jacksonville
Robert E. Lee and Andrew Jackson High Schools, Jacksonville
High and Grade School, Crescent City, Putnam County
Elementary School, Palatka, Putnam County

Alvin Roger Moore, Tallahassee
Chaires School, Chaires
Chiefland School, Chiefland
Liberty County High School, Bristol

H. Hastings Mundy, Miami
Ada Merritt Junior High School, Miami
Dade County Agricultural Senior High School, Miami
Gymnasium, Dade County Agricultural Senior High School, Miami

Jefferson D. Powell, Jacksonville
Norwood Public School, Jacksonville
Marietta Public School, Jacksonville
Public School, Folkston, Ga.

Howard M. Reynolds, Orlando
Orlando Senior High School, Orlando
Winter Park High School, Winter Park
Ocoee High School, Ocoee

E. L. Robertson, Miami
Auditorium and Cafeteria, Riverside School, Miami
William Jennings Bryan School, Miami
Auditorium and Cafeteria, Miami Edison High School, Miami
(George L. Pfeiffer, Associate Architect)

Henry L. Taylor, St. Petersburg
South Side Junior High School, St. Petersburg
Lakeview Avenue Grade School, St. Petersburg
Grade School for Colored Children, St. Petersburg

Nat Gaillard Walker, Fort Myers
Primary and Grade School, Estero
Primary and Grade School, West Fort Myers
Grade and High School, Boca Grande

Rudolph Weaver, Gainesville
Library, Florida State College for Women, Tallahassee
Gymnasium, Florida State College for Women, Tallahassee
Stadium, University of Florida, Gainesville

S. J. Welch, Pensacola
Jasper High School, Jasper
De Fumak Springs High School, De Fumak Springs
Panama City High School, Panama City

Walker D. Willis, Pensacola
George Halmark School, Pensacola
Crestview School, Crestview
Tate Agricultural School, Gonzalez

Frank A. Winn, Jr., Tampa
Benjamin Franklin Junior High School, Tampa
Wimauma Elementary-High School, Wimauma
John T. Kenley Elementary School, Tampa

GEORGIA

Cletus W. Bergen, Savannah *
Dining Hall, Georgia State Industrial College, Savannah
49th Street Graded School, Savannah (Consulting Architect)
Florance Street Graded School, Savannah (Consulting Architect)

Edward F. Billie, Atlanta
High School, Fort Valley (associated with Lockwood and Poundstone)
Auditorium and Gymnasium Wing, Alabama Military Institute, Anniston, Ala.
High School, Live Oak, Fla.

A. Ten Eyck Brown, Atlanta
Newberry High School, Newberry, S. C.
Fullerwood School, St. Augustine, Fla.
Canton High School, Canton

Harold Bush-Brown & J. H. Gailey, and Associates, Department of Architecture, Georgia School of Technology, Atlanta
Dining Hall, Georgia School of Technology, Atlanta
Daniel Guggenheim School of Aeronautics, Georgia School of Technology, Atlanta
Cloudman Dormitory, Georgia School of Technology, Atlanta

Wm. J. J. Chase, Atlanta
Monroe County High School, Forsyth
Rabun Gap-Nacoochee School, Rabun Gap
Moultrie High School, Moultrie

Daniell & Beutell, Atlanta
William A. Russell High School, Fulton County, Atlanta
Marietta High School, Marietta
Sparks-Adel High School, Adel

Dennis & Dennis, Macon
High School, Shellman
Grade & High School, West Point
School Building, Cuthbert

W. Elliott Dunwody, Jr., Macon
Law Building, Mercer University, Macon
New group of buildings, Wesleyan College, Macon (Walker & Weeks, Architects; Dunwoody & Oliphant, Associate Architects)
Bruce Grammar School, Macon (Dunwoody & Oliphant, Architects; Claude W. Shelverton, Associate Architect)

Edwards & Sayward, Atlanta
Classroom Building, Winthrop College, Rock Hill, S. C.
Columbia Theological Seminary, Atlanta
Girls Senior High School, Atlanta

Hentz, Adler & Shutze, Atlanta
North Fulton County High School, Atlanta
Sister's Chapel, Spelman College, Atlanta
Nurses' Home, Spelman College, Atlanta

Chas. H. Hopson, Atlanta
Clark University, Atlanta
Gammon Theological Seminary, Atlanta
Joel Chandler Harris Grammar School, Atlanta

Willis Irvin, Augusta
Additions and alterations, Girls High School, Augusta
Allendale Centralized School, Allendale, S. C.
William Robinson School, Augusta

Ivey & Crook, Atlanta
Chemistry Building, Emory University, Atlanta
Emory Junior College, Valdosta
Druid Hills District School, Decatur

Levy & Clarke, Savannah *
East Side Baldwin Kindergarten, Savannah (Cletus W. Bergen, Associate Architect)
Annex, Waters Avenue School, Savannah (Cletus W. Bergen, Associate Architect)
Florance Street School, Savannah (Cletus W. Bergen, Associate Architect)

T. F. Lockwood, Columbus
Central High School, Phenix City, Ala.
Vocational Building, Industrial High School, Columbus
Thomasville High School, Thomasville (Otis Clay Poundstone, Associate Architect)

Walter P. Marshall, Savannah *
Religious Education School, Savannah
Annex, Waters Avenue School, Savannah
49th Street School, Savannah

Morgan, Dillon & Lewis, Atlanta
Administration Building, Oglethorpe University, Atlanta
Founders Tower Group, same
Lupton and Lowry Halls, same

William Franklin Oliphant, Macon
Manual Training and Shop Building, Lanier High School for Boys, Macon (Claude W. Shelverton, Associate Architect)
A. L. Miller High School for Girls, Macon (Claude W. Shelverton, Associate Architect)
Alexander Grade School No. IV, Ingleside (Bibb County)

G. Lloyd Preacher & Co., Inc., Atlanta
Tubman High School for Girls, Augusta
Lanier High School for Boys, Macon
Evans High School, Spartanburg, S. C.

Arthur Neal Robinson, Atlanta
David T. Howard School, Atlanta
Dormitory, Eldridge Academy, Eldridge, Ala.
Rabun Valley High School, Dillard

Scroggs & Ewing, Augusta
Academy of Richmond County and Junior College, Augusta
Monte Sano Grammar School, Augusta

* All the public school work in Savannah is handled by the architectural firms in the city belonging to the American Institute of Architects. These firms are: Cletus W. Bergen, Levy & Clarke, Walter P. Marshall, Percy Sugden, Wallin and Comer.

HAWAII

Louis E. Davis, Honolulu
Science Buildings "A" and "B," McKinley High School, Honolulu
Academic Buildings "A" and "B," McKinley High School, Honolulu
Administration and Auditorium, McKinley High School, Honolulu

C. W. Dickey, Honolulu
Maunawili Training School for Girls (Administration and Classroom Building, 3 dormitories, Superintendent's house), Honolulu
Territorial Normal School, Honolulu
Kamehameha School (Library, Dining Hall, Gymnasium, 3 dormitories, Practice Cottage), Honolulu (Mayers, Murray & Phillip, Associate Architects)

Marshall H. Webb, Honolulu
St. Louis College (five buildings), Honolulu
Central Grammar School, Honolulu

IDAHO

Frank H. Paradice, Jr., Pocatello
Central School, Blackfoot
High School, Blackfoot
Girls' Dormitory, Southern Branch, University of Idaho, Pocatello

Wayland & Fennell, Boise
Administration and Library Building, Albion State Normal School, Albion
High School, Payette
High and Grade Schools, Shoshone

ILLINOIS

Ralph E. Abell Co., Chicago
Palatine Township High School, Palatine
McHenry Community High School, McHenry
Arlington Heights Township High School, Arlington Heights

Aldrich & Aldrich, Galesburg
Bateman School, Galesburg
Alice Ingersol Gymnasium, Canton
Grade and High School, Perry

Armstrong, Furst & Tilton, Chicago
Western Theological Seminary, Evanston
Graduate Building, University of Chicago, Chicago
North Elementary School, Glencoe

Aschauer & Waggoner, Decatur
Gorin Library, Millikin University, Decatur
Springfield Junior College, Springfield
St. James School, Decatur

Ashby, Ashby & Schulze, Chicago
Junior High School, Riverside
Grant Community High School, Fox Lake
Thomas Jefferson School, Berwyn

H. Frederic Beck, Chicago
Whittier Grade School, Harvey
Bryant Grade School, Harvey
Calumet City High School, Calumet City

F. E. Berger & R. L. Kelley, Champaign
Mattoon High School, Mattoon
St. Anne High School, St. Anne
Cerro Gordo High School, Cerro Gordo

Berlin & Swern, Chicago
Dormitories and Art Hall, Beloit College, Beloit, Wis.
Religious Education Building, First Congregational Church, Oak Park

Bradley & Bradley, Rockford
Gymnasium, Mount Morris College, Mount Morris
John W. Henney Grade School, Freeport
Pecatonica Community High School, Pecatonica

Herbert A. Brand, Chicago
St. Paul's Evangelical Lutheran School, Indianapolis, Ind.
Gymnasium, Concordia Teachers College, River Forest
Dormitory, Evangelical Theological Seminary, Naperville

Brooks, Bramhall & Dague, Decatur
Johns Hill Junior High School, Decatur
Washington Grade School, Decatur
Centennial Junior High School, Decatur

E. Norman Brydges, Chicago
Four Elementary Schools and One Junior High School, Elmhurst
Three Elementary Schools, Lombard
One Elementary and One Junior High School, Glen Ellyn

Cervin & Stuhr, Rock Island
High School, Moline
Junior High School, Macomb
Stadium, High School, Rock Island

Childs & Smith, Chicago
Nichols Intermediate School, Evanston
Longfellow Elementary School, Pontiac, Mich.
Lincoln High School, Wisconsin Rapids, Wis.

John D. Chubb, Chicago
Senior High School, Quincy (Behrensmeyer & Hafner, Associate Architects)
Southwestern Junior High School, Battle Creek, Mich. (L. J. Sarvis, Associate Architect)
Roosevelt School, Kenosha, Wis.

Edwin H. Clark, Inc., Chicago
Ferry Hall, Lake Forest, Ill.
Chicago Latin School, Chicago (Boys; also Girls)
Group of buildings, North Shore Country Day School, Winnetka

J. E. Coyle, Joliet
Lockport High School, Lockport
Crete Grade School, Crete
Geneva Grade School, Geneva

S. Lester Daly, Metropolis
Herrin Grade School, Herrin
Gymnasium, Metropolis Community High School, Metropolis
George Rogers Clark School, Paducah, Ky.

Deal & Ginzel, Lincoln
Gymnasium, Lincoln
High School, Lincoln
High School, Mason City

Doerr & Doerr, Chicago
Community Junior High School, Blue Island
Evergreen Park Grade School, Evergreen Park
Loretto Academy, Chicago

Floyd E. Dougherty, Chicago
Danville High School, Danville
West Chicago High School, West Chicago
J. H. Freeman Grade School, Aurora

Hamilton B. Dox, Peoria
Academy of Our Lady (Girls' Catholic High School), Peoria
St. Anthony's Parochial School, Streator
Franklin School, Peoria

N. Max Dunning, Chicago
Emerson School, Maywood (Van Gunten & Van Gunten, Associate Architects)
Glenbard Township High School, Glen Ellyn (auditorium and classroom addition)
Irving School, Maywood (Van Gunten & Van Gunten, Associate Architects)

George G. Elmslie, Chicago
Forbes Hall of Science, Yankton College, Yankton, S. Dak.
Power-Plant, Yankton College, Yankton, S. Dak.
Look Hall (for Men), Yankton College, Yankton, S. Dak.

Hermann J. Gaul & Son, Chicago
St. Michael's High School, Chicago
Sacred Heart Elementary School, Chicago
St. Benedict's Elementary School, Chicago

Paul Gerhardt, Chicago
Lane Technical School, Chicago
Parker Junior High School, Chicago
Austin Senior High School, Chicago

R. Z. Gill & Co., Murphysboro (also St. Louis, Mo.)
Du Quoin Township High School, Du Quoin
Rebuilding—Murphysboro Township High School, Murphysboro
Logan Junior High School, Murphysboro

Leonard Anthony Gliatto, Chicago
Mt. St. Mary's Academy, St. Charles
Our Lady of Perpetual Help, Glenview
Gymnasium, De La Salle Institute, Chicago

Granger & Bollenbacher, Chicago
Women's Memorial Residence Hall, Indiana University, Bloomington, Ind.
Pierce Hall (Men's Union Building), Kenyon College, Gambier, Ohio
Northwestern University Group, Evanston
14 Sorority Buildings
2 Dormitories (with James Gamble Rogers)

Hamilton, Fellows & Nedved, Chicago
Evanston Township High School, Evanston
Beiger School, Mishawaka, Ind.
High School Building and Gymnasium, Albert Lea, Minn.

Hewitt, Emerson & Gregg, Peoria
Theodore Roosevelt Junior High School, Peoria
Columbia Elementary School, Peoria
Three Elementary Schools, Aurora

Charles Hodgdon & Son, Chicago
Group of seven buildings, University of Chicago, Chicago
Group of three buildings, St. Olaf College, Northfield, Minn.
Glenbard High School, Glen Ellyn

Holabird & Root, Chicago
University School for Girls, Chicago
Garrett Biblical Institute, Northwestern University, Evanston
International House, University of Chicago, Chicago

Holmes & Flinn, Chicago
William Beye School, Oak Park
Severance Hall (dormitory), Carleton College, Northfield, Minn.
Emerson School, Oak Park

Benjamin A. Horn, Rock Island
Edison School, Rock Island (by firm of Cervin, Horn & Stuhr, now dissolved)
Public School Stadium, Rock Island (partly executed by firm of Cervin, Horn & Stuhr, now dissolved)
Denkman School, Rock Island

Denison B. Hull & Stanley W. Hahn, Chicago
Tanner Library, Illinois College, Jacksonville
Baxter Hall, Illinois College, Jacksonville
Meadville Theological School, Chicago

Robert M. Hyde, Chicago
Abraham Lincoln School, Cicero
Emerson Public School, Berwyn
Jefferson School, Berwyn

Jameson & Harrison, Peoria
Blaine-Sumner School, Peoria (Warren W. Day, Associate Architect)
San Jose High School, San Jose
Lewistown High School, Lewistown

William C. Jones Associates, Chicago
Elmhurst College (dormitories, library and class building), Elmhurst
Evangelical Orphanage and School, Bensonville
Kristian Public School, North Chicago

J. W. Kennedy, East St. Louis
Collinsville Township High School, Collinsville
Dupo Community High School, Dupo
Lincoln Gymnasium and Manual Training School, East St. Louis

Liese & Ludwick, Danville
Mayo Junior High School, Paris
Community High School, St. Joseph
Community High School, Tuscola

Jos. C. Llewellyn Co., Chicago
Provise Township High School, Maywood
Athletic Building, North Central College, Naperville
Gymnasium and Manual Arts Building, Ottawa Township High School, Ottawa

Lundeen, Hooton, Roozen & Schaeffer, Bloomington
Presser Hall (Music School Building), Illinois Wesleyan University, Bloomington
Community High School, Normal
Horatio G. Bent Grade School, Bloomington

W. F. McCaughey, Park Ridge
Union Ridge School, District No. 86, Norwood Park Township, Chicago
Niles School addition, District No. 71, Niles
Des Plaines Grammar School, Des Plaines (John D. Chubb, Associate Architect)

Miller & Wallace, Inc., Chicago
Providence High School, Chicago
Health and Physical Education Group, Valparaiso University, Valparaiso, Ind.
Holy Cross Academy, Tucson, Ariz.

Benj. Franklin Olson, Chicago
Rearrangement of campus layout, Elmhurst College, Elmhurst
President's residence, Elmhurst College, Elmhurst
Gymnasium and Natatorium Building, Elmhurst College, Elmhurst

Raymond A. Orput, Rockford
High-Grade School, Waterman
Harlem High-Grade School, Love's Park, Rockford
Holcomb Grade School, Holcomb

Charles Pauly & Son, Granite City
George W. Niedringhaus School, Granite City
Marshall School, Granite City
Louis Baer School, Madison

Edgar A. Payne, Galesburg
Consolidated School, Winnebago
Community High School, Durand
Grade and High School, Paw Paw

Perkins, Chatten & Hammond, Chicago
Three Elementary Schools, Park Ridge
Logan Junior High School, Princeton
Botany Laboratory, Chicago University, Chicago

Peterson & Johnson, Rockford
Theodore Roosevelt Junior High School, Rockford
Abraham Lincoln Junior High School, Rockford
Marengo Community High School, Marengo

L. Pfeiffenberger's Sons, Alton
Alton High School, Alton (Associate Architects with Roger, Danely & Smith)
Marquette High School, Alton
Rufus Easton Grade School, Alton

Pond & Pond and Edgar Martin, Chicago
Lindbergh Elementary School, Muskegon Heights, Mich.
Roosevelt School, Muskegon Heights, Mich.
University of Michigan League, University of Michigan, Ann Arbor, Mich.

J. E. O. Pridmore, Chicago
Stickney School, Chicago
College Building, Observatory, Lyceum Building and College Theater, De Paul University, Chicago

George E. Ramey, Champaign
Newman Foundation, Champaign
Lottie Switzer School, Champaign (Berger & Kelley, Associated Architects)
South Side School, Champaign (Berger & Kelley, Associated Architects)

Harry J. Reiger, Springfield
Grade School, Virden
Enos School, Springfield
Matheny School, Springfield

James B. Rezny & Adrian Rezny, Chicago
Assembly Hall and Gymnasium, Saints Cyril and Methodius School, Chicago
St. Marie of Celle Elementary School, Berwyn
Our Lady of the Mount Elementary School, Cicero

Herbert Hugh Riddle, Chicago
Dormitory, Chicago Theological Seminary, Chicago
Hilton Chapel, same
Library and Taylor Hall, same

E. E. Roberts & Elmer C. Roberts, Chicago
Lincoln School, Oak Park
Hawthorne School, Oak Park
Oak Park Baptist Community Center, Oak Park

O. W. Rubach, Belleville
Bunsen School, Belleville
Franklin School, Belleville
Washington School, Belleville

Monroe R. Sandel & Co., Chicago
St. Casimir's School, Chicago
St. Hyacinth's School, Chicago
St. Bruno's School, Chicago

Schmidt, Garden & Erikson, Chicago
College of Pharmacy, University of Illinois, Chicago
St. Mary's Springs Academy for Girls, Fond du Lac, Wis.
Nurses Training School, St. Francis Hospital, Pittsburgh, Pa.

William H. Schulzke, Moline
John Deere Junior High School, Moline
Galva High School, Galva
Geneseo High School, Geneseo

Shattuck & Layer, Chicago
Waukegan Junior High School, Waukegan
Washington Grade School, West Harvey
School of St. Thomas the Apostle, Chicago

Slupkowski & Piontek, Chicago
Rev. Francis Gordon Memorial (gymnasium and high school building), Chicago
Holy Trinity High School, Chicago
St. Francis Seminary and Monastery, Burlington, Wis.

N. S. Spencer & Son, Chicago
High School, Mt. Vernon, Ind.
Two High Schools, East St. Louis

Leo Strelka, Chicago
St. Hilary's Elementary School, Chicago
St. Eulalia's Elementary School, Maywood
St. Bronislava's Elementary School, Chicago

Leonard F. W. Stuebe, Danville
City High School, Kankakee
Grade and Junior High School, Savanna .
Tilton Grade School, Danville

John S. Van Bergen, Ravinia
Ravinia Auditorium and School, Highland Park
Braeside School, Highland Park
Chicago Junior School, Elgin

W. S. Vander Meer, Rockford
St. Thomas High School, Rockford
Muldoon High School, Rockford
St. Patrick School, St. Charles

Charles L. Wallace, Joliet
St. Margaret's Grade School, Chicago
Immaculate Conception Grade School, Elmhurst
St. Clotilde's Grade School, Chicago

C. W. Webster, Waukegan
Addition to West School, Waukegan
North School, Waukegan
Jackson School, Waukegan

James M. White, Urbana
Materials Testing Laboratory, University of Illinois, Urbana
Addition to Lincoln Hall, University of Illinois, Urbana
Annex to Chemistry Building, University of Illinois, Urbana

INDIANA

Austin & Shambleau, South Bend
James Whitcomb Riley Junior High School, South Bend
Senior High School addition to James Whitcomb Riley Junior High School, South Bend
James Madison Junior High and Elementary School, South Bend

Harry Philip Bartlett, Indianapolis
Roosevelt School, Kokomo
Meridian School, Kokomo
High School, Connersville

Carroll O. Beeson, Crawfordsville
Addition to Lebanon High School, Lebanon
Addition to Crawfordsville High School, Crawfordsville
Addition to Darlington School, Darlington

Leighton Bowers, Fort Wayne
Churubusco High School, Churubusco
School Administration Building, Fort Wayne
Oxford Grade School, Fort Wayne

Harry E. Boyle & Co., Evansville
High School, Paoli
High School, Harrisburg, Ill.
High School, Glasgow, Ky.

Le Roy Bradley, Fort Wayne
Brightside School, Plymouth
Johnson Township High School, Wolcottville
Bourbon Consolidated School, Bourbon

Everett I. Brown, Fort Wayne
Silver Lake School, Silver Lake
Chester School, North Manchester
Syracuse High School, Syracuse

Charles H. Byfield, Indianapolis
Grade School No. 85, Indianapolis
Centre Township Grade School No. 3, Indianapolis
District School No. 15, Bridgeport

Robert Frost Daggett, Indianapolis
Asbury Hall (Recitation Building) De Pauw University, Greencastle
Chemistry Building, Indiana University, Bloomington
Butler University Group, Indianapolis (Thomas Hibben, Associate Architect)

Willard M. Ellwood, South Bend
High School, Crisman
Junior High School remodeled, South Bend
Boys' Vocational School, South Bend

Fowler & Karges, Evansville
Lincoln High School, Evansville
Henry Ries Grade School, Evansville
St. Vincent School and Orphanage, Vincennes

Freyermuth & Maurer, South Bend
James Monroe School, South Bend
Benjamin Harrison School, South Bend
Abraham Lincoln School, Peru

J. W. Gaddis, Vincennes
High School, Oaktown
High School, Sandborn
Grade and High School, Allendale, Ill.

Griffith & Goodrich, Fort Wayne
Elmhurst School, near Fort Wayne
Hillcrest School, near Fort Wayne
Cleveland Township School, South Whitley

Alfred Grindle, Bloomington
Bloomington High School extension, Bloomington
Elms Heights Grade School, Bloomington
D. Eckley Hunter Grade School, Bloomington

Harrison & Turnock, Indianapolis
Indiana School for the Blind, Indianapolis
Carpenter Hall, Earlham College, Richmond
Crispus Attucks High School, Indianapolis

Henkel & Hanson, Connersville
Mentone Grade and High School, Mentone
Madison High School, Madison
North Manchester Grade School, North Manchester

Norman H. Hill, Indianapolis
Union Township Consolidated School, Johnson County
Taylorsville Consolidated School, Taylorsville
Wayne Township Consolidated School, Hamilton County

Omar Hodge, Indianapolis
Pleasant View School, Wayne Township, Wayne County
Highland School, Wayne Township, Wayne County
James Whitcomb Riley School, Wayne Township, Wayne County

J. Edwin Kopf & Deery, Indianapolis
Shortridge High School, Indianapolis
Wabash High School, Wabash
School No. 81, Indianapolis

O. L. Hill, Bedford
Burris School addition, Mitchell
Ellettsville High School, Ellettsville
Fayetteville High School, Fayetteville

McGuire & Shook, Indianapolis
Perry Township School, Indianapolis
School No. 82, Indianapolis
Sheridan Schools, Sheridan

Miller & Yeager, Terre Haute
Woodrow Wilson Junior High School, Terre Haute
Girls' Dormitory, Indiana State Teachers College, Terre Haute
Gymnasium Building, Indiana State Teachers College, Terre Haute

Callix E. Miller, South Bend
Holy Cross School, South Bend
Chapel, St. Mary's College, Notre Dame
St. Mary's School, Niles, Mich.

Hubert Miller, Elkhart
Lakeville High School, Lakeville
Parkside School, Goshen
Hawthorne School, Elkhart

Karl D. Norris, East Chicago
Roosevelt Junior High School, East Chicago
Lincoln Grade School, Indiana Harbor
La Grange Grade School, La Grange

Parker & Faulstich, Indianapolis
Atlanta High School, Atlanta
Delaware Township High School, Fishers
Guilford Township High Sihool, Plainfield

Wm. Gregory Rammel, Logansport
James Whitcomb Riley Junior High School Group, Logansport
Noble Township School, Logansport
Tippecanoe Township School, Delphi

Frank P. Riedel, Lafayette
Longlois Grade School, Lafayette
St. Ann's Parochial Grade School, Lafayette
Beech Grove Grade School, Beech Grove

Walter Scholer, Lafayette
Purdue Campus, West Lafayette
West Lafayette Grade School, West Lafayette
Portland High School, Portland

Robert W. Stevens, Huntington
St. Felix Capuchin Monastery, Huntington
Central Grade School, Huntington
Dallas Township Consolidated School, Andrews

Geo. J. Stoner & Co., Terre Haute
Glenn High School, East Glenn
North Terre Haute High School, North Terre Haute
Concannon High School, West Terre Haute

Sutton & Routt, Vincennes
St. Mary's School, Washington
Vincennes Gymnasium and Coliseum, Vincennes
Grade School and Gymnasium, Mt. Carmel

Charles L. Troutman, Evansville
Carpenter Grade School, Evansville
Benjamin Bosse High School, Evansville
Tell City High School, Tell City

Wainwright, Wilkins & Co, Hammond
Junior High School, East Gary
Elementary School, Tinley Park, Ill.
Senior High School Group, Hobart

E. R. Watkins, Anderson
The Longfellow School, Anderson
Anderson High School Gymnasium, Anderson
Otterbein College Gymnasium, Westerville

Werking & Son, Richmond
High School, Mays
High School, Milan
High School, Oldenburg

Joe H. Wildermuth & Co., Gary
Tolleston Primary School, Gary
Public Schools Memorial Auditorium, Gary
Milford High School, Milford, Ill.

Ernest W. Young, South Bend
Thomas Jefferson School, South Bend
Benjamin Franklin School, South Bend
Lincoln High School, Plymouth

IOWA

Charles Altfillisch, Decorah
C. K. Preus Gymnasium, Luther College, Decorah
Theta Xi Fraternity House, Iowa City
High School additions, Decorah

Beuttler & Arnold, Sioux City
East Senior High School, Sioux City
High School, Onawa
Public School, Alcester, S. Dak.

Clausen, Kruse & Klein, Davenport
Garfield Elementary School, Davenport
St. Paul's Parochial School, Davenport
Administration Building, Gymnasium, Boiler House for Board of Education, Davenport

Mortimer B. Cleveland, Waterloo
Hawthorne School, Waterloo
Gymnasium, Upper Iowa University, Fayette
Gymnasium, Fletcher College, Oskaloosa

E. O. Damon, Jr., Fort Dodge
St. Mary's School and Convent, Mallard
St. Cecilia's School, Algona
Kamrar High and Grade School, Kamrar

Dougher, Rich & Woodburn, Des Moines
Jefferson Grade School, Muscatine
Oakland High and Grade School, Oakland
Carson Memorial High School, Marengo

Arthur H. Ebeling, Davenport
Maquoketa High School, Maquoketa
Davis Hall, St. Ambrose College, Davenport
Lewis Science Hall, St. Ambrose College, Davenport

Frank W. Griffith, Fort Dodge
Wahkonsa Grade School, Fort Dodge
Duncombe Grade School, Fort Dodge
Butler Grade School, Fort Dodge

J. Chris Jensen, Council Bluffs
Bloomer School, Council Bluffs
Dana College, Blair, Nebr.
Franklin School, Council Bluffs

Keffer & Jones, Des Moines
Junior High School, Estherville
Storm Lake High School, Storm Lake
High School, Emmetsburg

C. I. Krajewski, Dubuque
St. Casimir's School, Hammond, Ind.
Our Lady of Seven Dolors School, Festina
St. Symphorosa School, Chicago, Ill.

Raymond F. Moore, Cedar Rapids
High and Grade School, Stronghurst, Ill.
High and Grade School, Ackley
High School, Wayland

John Normile, Des Moines
St. Augustine School, Des Moines
Assumption School, Granger
St. Patrick's School, Ottumwa

Harry E. Reimer, Marshalltown
Garwin High School, Garwin
High School, State Center
High School, Newburg

J. F. Reynolds, Sioux City
Rushville High School, Rushville, Nebr.
Salix High School, Salix
Sargent High School, Sargent, Nebr.

Charles L. Ritts, Burlington
Oak Street Junior High School, Burlington
Addition to Prospect Hill School, Burlington
High School addition, Burlington

George A. Spooner, Council Bluffs
Gymnasium, Abraham Lincoln High School, Council Bluffs
Underwood Consolidated School, Underwood
Sigma Nu Fraternity House, Lincoln, Nebr.

Tinsley, McBroom & Higgins, Des Moines
Two School Buildings for Board of Education, Des Moines
Field House, Drake University, Des Moines
Women's Dormitory, Drake University, Des Moines

John C. Wood, A. H. Morrell, Associate Architects, Clinton
Grade School, Clinton
High and Grade School, Camanche
High and Grade School, Andrew

Charles B. Zalesky, Cedar Rapids
McKinley High School, Cedar Rapids
Mt. Marcey Academy, Cedar Rapids
St. Patrick's School, Cedar Rapids

KANSAS

Ellis Charles, Wichita
Williard Elementary School, Wichita
Ingalls Elementary School, Wichita
Washington Elementary School, Anthony

Cuthbert & Suehrk, Topeka
Gage Park Grade School, Topeka
Auditorium, Kansas University, Lawrence
Teachers Training School, Emporia

Ed Forsblom, Wichita
A. A. Hyde Grade School, Wichita
Administration Building, University of Wichita, Wichita
Robinson Intermediate School, Wichita

W. E. Glover, Topeka
Rural High School, St. Marys
Rural High School, Eskridge
School and dormitories for Security Benefit Insurance Co. Home and Hospital, Topeka

W. E. Hulse & Co., Hutchinson
High School, Marceline, Mo.
Hutchinson Junior College, Hutchinson
Rural High School, Hugoton

Mann & Co., Hutchinson
Community High School, Scott City
Community High School, St. Francis
Senior High School, Lyons

Peterson & Almon, Kansas City
Washington Rural High School, Bethel
Grade School, Turner
High School, Brunswick, Mo.

Routledge & Hertz, Hutchinson
Consolidated High School, Protection
Grade School, Kinsley
Rural High School, Buhler

Ralph E. Scamell, Topeka
High School, Lyndon
Boys' Dormitory, Central Cololege, McPherson
High School, Tonganoxia

Charles W. Shaver, Salina
Rural High School, Randolph
Rural High School, Talmage
Oakdale Grade School, Salina

Smith & English, Hutchinson
Grade School, Oxford
Rural High School, Minneola
Grade School, Satanta

Glen H. Thomas, Wichita
Wichita High School North, Wichita
Senior High School, Coffeyville
High School, Otis

S. S. Voigt, Wichita
High School, Belleville
High School, Lakin
High School, Lost Springs

Thos. W. Williamson & Co., Topeka
Central High School, Topeka
Science Hall, Baker University, Baldwin
Field House, Washburn College, Topeka

KENTUCKY

H. A. Churchill & John T. Gillig, Lexington
Gymnasium, Kentucky Wesleyan College, Winchester
Hughes Memorial Auditorium, Asbury College, Wilmore
School and Gymnasium, Kentucky State Houses of Reform, Greendale

J. Meyrick Colley, Louisville
Western High School for Girls, Louisville
Group of seven Junior High Schools, Louisville
Group of five Elementary Schools, Louisville

Fred Erhart, Louisville
Sacred Heart Academy, Louisville
St. Francis of Assisi Grade School, Louisville
St. Joseph Academy, St. Joseph

O. W. Holmes, Louisville
Mt. Tabor Grade School, New Albany Township, Floyd County, Ind.
Ohio Falls Grade School, Clarksville, Ind.
Okolona High School, Okolona

C. W. Kimberlin, Owensboro
Daviess County High School, Owensboro
Nortonville Consolidated School, Nortonville
Dundee Grade and High School, Dundee

Albert F. Klein, Ashland
William C. Condit Grade School, Ashland
John F. Hager Grade School, Ashland
Booker T. Washington Grade School, Ashland

D. X. Murphy and Brother, Louisville
Nine buildings remodeled for the University of Louisville, Louisville
Anchorage Graded School, Anchorage
St. Brigid Parochial School, Louisville

Thomas J. Nolan, Louisville
St. Cecilia's Parochial Grade School, Louisville
Christ the King Parochial Grade School, Louisville
St. Francis of Rome Parochial Grade School, Louisville

Leo L. Oberwarth & Sons, Frankfort
High School and Auditorium, Frankfort
Auditorium and School Building, Institute for Backward Children, Frankfort
Consolidated School, Bagdad

G. Tandy Smith, Jr., Paducah
Group of six buildings, Murray State Teachers College, Murray
Andrew Jackson Grade School, Paducah
Administration Building, West Kentucky Industrial College, Paducah

Arthur G. Tafel, Louisville
Stadium, DuPont Manual Training High School, Louisville
Jeffersontown High School, Jeffersontown
Fairdale High School, Fairdale

John T. Waller, Hopkinsville
Adairville Consolidated School, Adairville
Lewisburg Consolidated School, Lewisburg
La Fayette Consolidated School, La Fayette

LOUISIANA

William R. Burk, New Orleans
Joseph Maumus School, Arabi
Hope Haven Agricultural and Mechanical School, Marrero
Leon Godchaux High School, Reserve

E. A. Christy, New Orleans
Charles J. Colton School, New Orleans
Martin Behrman School, New Orleans
Alcee Fortier Boys High School, New Orleans

Herman J. Duncan & Co., Inc., Alexandria
Franklinton High School, Franklinton
Lawtell School, Lawtell
Calvin School, Calvin

Faurot & Livaudais, Ltd., New Orleans
Belton High School, Alexandria
Training School, Louisiana State Normal School, Natchitoches
Kentwood High School, Kentwood

Robert H. Goodman, Baton Rouge
Independence High School, Independence
Magnolia Elementary School, Baton Rouge
Beauregard Elementary School, Baton Roouge

Edward F. Neild, Shreveport
Two High Schools and one Grammar School, Shreveport
One High School, Haynesville
High School, Homer

William T. Nolan, New Orleans
Baton Rouge Senior High School, Baton Rouge
Elton Group, one High School, one Elementary School, Elton
State School for the Deaf, Baton Rouge

Theodore L. Perrier, New Orleans
Eighth Ward School, Jefferson Parish
St. Catherine of Sienna Parochial School, Metairie Ridge
Crossman Annex, New Orleans

Martin Shepard, New Orleans
St. Matthias Parochial School, New Orleans
Novitiate Convent, Lafayette
High School addition, Pascagoula, Miss.

Weiss, Dreyfous & Seiferth, Inc., New Orleans
Medical Center, Louisiana State University, New Orleans
Music and Dramatic Arts Building, Louisiana State University, Baton Rouge
Field House and Recreation Center, Louisiana State University, Baton Rouge

Wogan and Bernard, New Orleans
Jesuit High School Group, New Orleans
Louisiana State University Group, Baton Rouge
Bernard Terrace School, Baton Rouge

C. Scott Yeager, Alexandria
Orange High School, Leesville, Vernon Parish
Pollock High School, Pollock, Grant Parish
Dry Prong High School, Dry Prong, Grant Parish

MAINE

Bunker & Savage, Augusta
Winslow High School, Winslow
Bath High School, Bath
Rockland High School, Rockland

Harry S. Coombs, Lewiston
Lewiston High School, Lewiston
Skowhegan High School, Skowhegan
Grade School, Farmington

Crowell & Lancaster, Bangor
Group of four buildings, University of Maine, Orono
High School Building, Good Will Home Association, Hickley
School Building, Higgins Classical Institute, Charleston

Miller & Beal, Inc., Portland
Edward Little High School, Auburn
North Yarmouth Academy, Yarmouth
Lawrence High School, Fairfield

John Calvin Stevens & John Howard Stevens, Portland
Kelsey Street Primary School, South Portland
Pine Street Primary School, South Portland
Fryeburg Academy, Fryeburg

MARYLAND

C. M. Anderson, Baltimore
Baltimore Polytechnic Institute, Baltimore
Dining Hall and Science Building, Western Maryland College, Westminster
McDaniel Hall (girls' dormitory), Western Maryland College, Westminster

Frank J. Baldwin, Baltimore
Mt. St. Mary's College, Emmitsburg
College of Notre Dame of Maryland, Baltimore
Mt. St. Agnes' College, Mt. Washington

William W. Emmart, Baltimore
Gymnasium, Dickinson College, Carlisle, Pa.
Administration Building, St. Charles College, Baltimore
Northeast Junior High School, Baltimore

W. H. Emory, Jr., Baltimore
Ellicott City High School, Ellicott City (associated with I. W. Pietsch)
West Friendship School, West Friendship (associated with I. W. Pietsch)
McDonogh School, McDonogh (associated with Smith & May)

Clyde N. Friz & Nelson Friz, Baltimore
Windsor Hills School, Baltimore
Hamilton School, Baltimore
Arlington School, Baltimore

Robert Harris, Baltimore
Curtis Bay Vocational School, Baltimore
Elementary School, St. Mary's County
Mechanicsville High School, Mechanicsville

Henry Powell Hopkins, Baltimore
Cambridge High School, Cambridge
Maryland Training School for Boys, Loch Raven
Easton High School, Easton

Herbert G. Jory, Baltimore
Elementary School, Baltimore
Nurses Home and Training School, South Baltimore General Hospital, Baltimore
Highlandtown School, Baltimore

Hugh I. Kavanagh, Baltimore
St. Mary's Industrial School, Baltimore
St. John's School, Frederick
Little Flower School, Baltimore

A. J. Klinkhart, Hagerstown
Hagerstown High School, Hagerstown
Fairview Avenue Grade School, Waynesboro, Pa.
Clearspring High School, Clearspring

Mottu & White, Baltimore
Friends School Group, Baltimore
Donaldson School Group, Howard County
St. James School Group, Washington County

Smith & May, Baltimore
Gwynns Falls Park High School, Baltimore
Entire group, Maryland State Normal School, Salisbury
Forty-five school buildings (total in county), Baltimore County

Upjohn & Glidden, Baltimore
Public School No. 84, Baltimore
Girls' Latin School, Baltimore
St. Catherine's School for Girls, Richmond, Va.

Lucius R. White, Jr., Baltimore
Southern Junior High School, Baltimore
Library Building, Loyola College, Baltimore
Administration Building, Department of Education, Baltimore

Wyatt & Nolting, Baltimore
Canton School, Baltimore
Physics Building, Johns Hopkins University, Baltimore
Patterson Park Junior High School, Baltimore

MASSACHUSETTS

Adden, Parker, Clinch & Crimp, Boston
Beverly High School, Beverly
Reading Junior High School, Reading
Manter Hall School, Cambridge (Charles H. Way, Associate Architect)

Allen & Collens, Boston (also New York City)
Union Theological Seminary, New York City
Hartford Theological Seminary, Hartford, Conn.
Andover Theological Seminary, Cambridge

James E. Allen, Lawrence
Lawrence High School, Lawrence
Francis Leahy Elementary School, Lawrence
George W. Brown Elementary School, Newburyport

J. W. Ames & E. S. Dodge, Boston
Dormitories, Smith College, Northampton
Gymnasium, Smith College, Northampton
Kingswood School, West Hartford, Conn.

Andrews, Jones, Biscoe & Whitmore, Boston
Dormitory Group, The Masters School, Dobbs Ferry, N. Y.
The Sheridan School, Salem
Physical Education Building, Tufts College, Medford

Ashton & Huntress, Lawrence
Junior High School, Portsmouth, N. H.
James F. Leonard Elementary School, Lawrence
Park Street School, Lawrence

Elmer Smith Bailey, Boston
Layout of William E. Nickerson Recreation Field: Stadium, Field Houses, Football Dormitory, Boat House, etc., Boston University, Boston
School program for Sanford, Me.: Edison and Lincoln Schools and addition to the High School
School program for Manchester, N. H.: Practical Arts High School, West Side High School, and Franklin Grade School

D. R. Baribault, Springfield
St. Joseph's School, Springfield
Notre Dame School, Holyoke
St. Vital School, Fort Garry

J. Williams Beal, Sons, Boston
Whitman High School, Whitman
Rockland Junior-Senior High School, Rockland
Melrose High School, Melrose

William H. Brainerd Associates, Boston
Selden L. Brown School, Wellesley
Six Grade High School, Peterborough, N. H.
Junior High School, Winthrop

L. W. Briggs Co., Worcester
South High School Gymnasium and Classroom Building, Worcester
Auburn Elementary School, Auburn
Addition to Worcester Boys' Trade School, Worcester

Brown & Poole, New Bedford
Grade School, Dartmouth
Grade School, Dracut
High School, Dartmouth

Edwin T. Chapin, Worcester
Addition to Ledge Street School, Worcester
Andover Street School, Worcester
Addition to School, Sutton

Office of William Chapman, Boston
Daniel Webster Junior High School, Quincy Point
Adams Shore School, Adams Shore
Merrymount School, Merrymount, Quincy

Coolidge & Carlson, Boston
Aeronautical Laboratory, Engine Testing Laboratory, Dormitories, Chemistry and Physics Research Laboratory, Massachusetts Institute of Technology, Cambridge
Science Building, Radcliffe College, Cambridge
Classroom Building and Recreation Building, Girls' School, Berry Schools, Mount Berry, Ga.

Coolidge, Shepley, Bulfinch & Abbott, Boston
New York Hospital-Cornell Medical College, New York, N. Y.
Biological Laboratories, Harvard University, Cambridge
Harvard Memorial Chapel, Harvard University, Cambridge

Frank Irving Cooper Corp., Boston
North High School, Quincy
Franklin Junior High School, Norwalk
Somerville High School, Somerville

Edward M. Corbett, Fall River
Technical High School, Fall River
Warren High School, Warren, R. I.
Hebronville School, Attleboro

George A. Cornet, Lynn
Lynn English High School, Lynn
Eastern Junior High School, Lynn
Lynn Trade School, Lynn

Cram and Ferguson, Boston
Chapel, Princeton University, Princeton, N. J.
Three dormitories, Phillips Exeter Academy, Exeter, N. H.
Chapel, St. George's School, Newport, R. I.

Cutting, Carleton & Cutting, Worcester
May Street School, Worcester
Sycamore Street Continuation School addition, Worcester
Lincoln Street School, Worcester

Derby, Barnes & Champney, Boston
Hingham High School, Hingham
George Washington Elementary School, Winchester
Bedford Junior High School, Bedford

Alfred O. Dion, Brookline
St. Athanasius School, Rumford, Me.
St. Therese School, Mexico, Me.
Marshfield Junior High School, Marshfield

Ralph Harrington Doane, Boston
Weston High School, Weston
Sharon High School, Sharon
Braintree Highlands School, Braintree

John William Donahue, Springfield
Providence College, Providence, R. I.
Our Lady of The Elms, College and Academy Buildings, Chicopee
LaSalle Academy, Providence, R. I.

William W. Drummey, Inc., Boston
William McKinley School, Revere
Lafayette School, Everett
Beethoven School (First Standard School), Boston

M. A. Dyer Co., Boston
Municipal Group, Webster: Town Office Building, Senior High School, Junior High School, and Auditorium (one building)
Leominster Junior High School, Leominster
Milton F. Roberts Junior High School, Medford

George H. Fugere & Son, Chicopee Falls
Michael A. Kirby Junior High School, Chicopee
St. George School, Chicopee
Patrick A. Bowe School, Chicopee

E. C. & G. C. Gardner, Springfield
Dormitory and Campus Group, International Y. M. C. A. College, Springfield
Chestnut Street School, Springfield
Van Sickle Junior High School, Springfield

Edward T. P. Graham, Boston (also Cleveland, Ohio)
Our Lady Help of Christians School, Newton
Abraham Lincoln School, Cambridge
Cathedral High School, Boston

Malcolm B. Harding, Westfield
Longmeadow Center School, Longmeadow
High School, Westfield
Consolidated Grade School, Southwick

Hartwell & Richardson, Boston
Springfield High School, Springfield
Newton High School, Newton
Cambridge Latin School, Cambridge

Haven & Hoyt, Boston
Newton Central High School, Newton
New England Conservatory of Music, Boston
Salem Hospital Training School Home for Nurses, Salem

Haynes & Mason, Leominster (also Fitchburg, Mass., & Hartford, Conn.)
High School, Springfield, Vt.
Consolidated School, Vineyard Haven
Grade School, Milford, Conn.

Henry & Richmond, Boston
John Wingate Weeks High School, Newton Center
Massachusetts School of Art, Boston
Samuel F. B. Morse Laboratory of Chemistry, Physics and Biology, Phillips Academy, Andover

Hutchins & French, Boston
Henry Whittemore Grade School, Waltham
Group of buildings, Tilton School, Tilton, N. H.
High School, South Berwick, Me.

Paul Beekman Johnson, West Springfield
High School addition, Agawam
North Agawam School addition, Agawam
Springfield Street School addition, Agawam

Kilham, Hopkins & Greeley, Boston
Franklin School, Lexington
Stanley School, Swampscott
Cambridge School, Weston

J. D. Leland & Company, Boston
Junior High School, Worcester
Junior High School, Fitchburg
Concord High School, Concord, N. H. (George W. Griffin, Associate Architect)

Morris W. Maloney, Springfield
Elias Brookings School, Springfield
Samuel Bowles School, Springfield
Robert O. Morris School, Springfield

McLaughlin & Burr, Boston
Agassiz-Bowditch District Intermediate School, Boston
Henry Wadsworth Longfellow Intermediate School, Cambridge
Grade School No. 6, Port Washington, N. Y.

W. H. McLean, Boston
Copley Building, People's Academy, Morrisville, Vt.
Bellows Free Academy, St. Albans, Vt.
Junior-Senior High School, Provincetown

Harry L. Meacham Associates, Worcester
Graniteville Grade School, Johnston, R. I.
Horace Mann School, Franklin
Appleton Academy, New Ipswich, N. H.

Maurice P. Meade, Bostoon
William H. Lincoln Grade School, Brookline
St. Mary's High School, Lynn
St. Mary's High School, Brookline

Morse & Dickinson, Boston
Two buildings, J. C. Tilton School, Haverhill
Physical Education Buildings, Massachusetts State College, Amherst

O. E. Nault & Son, Worcester
Assumption College, Worcester
St. Ann's Academy, Marboro
Holy Rosary School, Gardner

Perry, Shaw & Hepburn, Boston
College of William and Mary, Williamsburg, Va.
New group for Radcliffe College, Cambridge
Dexter School, Brookline

Putnam & Cox, Boston
Physics Building, Mount Holyoke College, South Hadley
Science Building, Mount Holyoke College, South Hadley
Rockefeller, Jr., Dormitory, Mount Holyoke College, South Hadley

James H. Ritchie & Associates, Boston
Massachusetts State College Group, Amherst
High School, Westboro
John Ward School, Newton

Jasper Rustigian, Worcester
Nelson Place School, Worcester
Bloomingdale Road School No. 2, Worcester
Adams Street School, Worcester

Sanborn & Weed, Lynn
English High School, Lynn
Home-Making School for Girls, Essex County Agricultural School, Hathorne
Cobbett Elementary School and Administration Building (for School Department), Lynn

Shepard & Stearns, Boston
High School, Braintree
Junior High School, South Quincy
Senior and Junior High School, Dover

Strickland, Blodget & Law, Boston
University of Beirut, Syria
Dormitory for Middlesex School, Concord
Mechanical Engineering Building, University of Maine, Orono, Maine

Office of R. Clipston Sturgis, Boston
Needham High School, Needham
Lawrence School, Brookline
Sudbury School, Sudbury

Matthew Sullivan, Boston
Refectory Building, St. John's Preparatory School, Danvers
St. Thomas' High School, Jamaica Plain, Boston
Our Lady of Grace School, Everett

William Tallman, New Bedford
Roosevelt Junior High School, New Bedford
Addition to The Fairhaven High School (Rogers Memorial) Fairhaven
South Elementary School, Nantucket

Walker & Walker, Boston
Washington Irving School, Boston
Washington School, Boston
Michelangelo School, Boston

Edward I. Wilson, Boston
Second unit, Revere Senior-Junior High School, Revere
James A. Garfield Junior High School, Revere
High School, Wilmington

MICHIGAN

Samuel C. Allen, Saginaw
Clio High School, Clio
Lasalle High School, St. Ignace
Carman School, Flint

George J. Bachmann, Flint
Kearsley School, Flint
Bendle School, Flint
Herbert Hoover School, Flint

Ernest S. Batterson, Kalamazoo
High School, Zeeland
Union School, Centreville
Woodrow Wilson School, Kalamazoo

Billingham & Cobb, Kalamazoo
Dowagiac High and Grade School, Dowagiac
Central High School, South Haven
Otsego High School, Otsego

J. Vanden Bogert, Grand Rapids
Oakleigh School, Grand Rapids
Hudsonville School, Hudsonville
Woodworth School, Grand Rapids

J. N. Churchhill, Lansing
Walter H. French Junior High School, Lansing
Eastern High School, Lansing
Henry R. Pattengill Junior High School, Lansing

Colton & Knecht, Grand Rapids
St. Thomas' School and Chapel, Grand Rapids
Gymnasium, St. Andrew's Cathedral Parish High School, Grand Rapids
St. Isidore's School, Grand Rapids

Cowles & Mutscheller, Saginaw
School and Auditorium, Swartz Creek
Kinney School, Mt. Pleasant
Daniel Axford Grade School and Auditorium, Oxford

J. Ivan Dise, Detroit
Alexander Hamilton School, Detroit
Christopher Columbus School, Detroit
Stevens T. Mason School, Detroit

Donaldson & Meier, Detroit
Sacred Heart Seminary Group, Roman Catholic Diocese of Detroit
Thomas M. Cooley High School, Detroit
Elizabeth Cleveland Intermediate School (for Board of Education), Detroit

A. H. Ellwood & Son, Kalamazoo
Ligonier High School, Ligonier, Ind.
Hamilton High School, Hamilton, Ind.
Lawrence High School, Lawrence

Frank S. Forster, Muskegon
Junior and Senior High School, Big Rapids
Elementary and High School, Muskegon Heights
Froebel Elementary School, Muskegon

R. V. Gay, St. Johns
Manistique Junior High School, Manistique
Cement City High School, Cement City
Gerrish-Higgins Rural Agricultural High School, Roscommon

R. S. Gerganoff, Ypsilanti
Ypsilanti High School addition, Ypsilanti
High School, Gymnasium, Ypsilanti
Woodruff School addition, Ypsilanti

Joseph C. Goddeyne, Bay City
Bay County Building, Bay City
Immanuel Lutheran School, Bay City
Woodside School, Bay City

Nathaniel O. Gould, Detroit
New group of buildings, Wayne County Training School, Northville
Juvenile Detention School, Detroit
Clara B. Arthur School, Detroit

George J. Haas, Detroit
Grosse Pointe High School, Grosse Pointe
Lakeview High School, Ste. Claire Shores
Stephen T. Mason School, Grosse Pointe

Homer Harper, Benton Harbor
Morton School, Benton Harbor
Bard School, Benton Harbor
Lakeside School, Lakeside

Aloys Frank Herman, Inc., Detroit
St. Mary Magdalen School, Melvindale
McFarlane School, Detroit
Nativity School, Toledo, Ohio

Warren S. Holmes Co., Lansing
Francis W. Pennington School, Mount Vernon, N. Y.
George P. Phenix School, Hampton Institute, Hampton, Va.
Junior-Senior High School, East Detroit

Austin Alonzo Howe, Detroit
Jared W. Finney School, Detroit
Frederick William Von Steuben School, Detroit
Anthony Wayne School, Detroit

Derrick Hubert, Menominee
Engineering Building, Michigan College of Mining and Technology, Houghton
Ontonagon High School, Ontonagon
St. Joseph's Grade-High School and Convent, Lake Linden

Albert Kahn, Inc., Detroit
Science Building, Medical Building, Angell Hall, University of Michigan, Ann Arbor
Ann J. Kellogg School, Battle Creek
Southeastern Junior High School, Battle Creek

Louis Kamper, Inc., Detroit
Henry Philip Tappan Intermediate School, Detroit
Frederick William Higgins Elementary School, Detroit
John F. Bennett School addition and Power House, Detroit

Hugh T. Keyes, Detroit
Calvin Coolidge Junior High School, Ferndale
Taft School, Ferndale
Jefferson School, Ferndale

Lane-Davenport, Inc., Detroit
Ferris Institute, Big Rapids
Quincy High School, Quincy
Union City High School, Union City

LeRoy & Newlander, Kalamazoo
Central High School, Kalamazoo
Slocum Truax High School, Trenton
High School, Lapeer

Frederick D. Madison, Royal Oak
1927 Royal Oak High School and All-Grade School, Royal Oak
Barnum Junior High School, Birmingham
Lapham School, Allen Park

Malcomson & Higginbotham & Trout—A. W. Balle, Associate, Detroit
Women's Dormitory, University of Michigan, Ann Arbor
University of Detroit High School and Faculty Building, University of Detroit, Detroit
University Elementary School, University of Michigan, Ann Arbor

George D. Mason & Co., Detroit
Thomas A. Edison School, Dearborn
Gabriel Richards School, Detroit
U. S. Grant School, Detroit

McGrath & Dohmen, Detroit
Annie Lathrup School, Birmingham
John Marshall School, Detroit
Loren M. Post School, Detroit

Harry L. Mead, Grand Rapids
St. Adalbert's Grade School, Grand Rapids
St. Philip's High School, Battle Creek
Emerson Grade School, Ionia

F. E. Parmelee, Iron Mountain
L'Anse High School, L'Anse
Iron Mountain Junior High School, Iron Mountain
Kingsford High School, Kingsford

Robinson & Campau, Grand Rapids
High School, East Grand Rapids
Junior High School, Holland
Seminary, Calvin College, Grand Rapids

Lewis J. Sarvis, Battle Creek
Battle Creek College Library, Battle Creek
Fremont School, Battle Creek
Southwestern Junior High School, Battle Creek (J. D. Chubb, Collaborating Architect)

Smith, Hinchman & Grylls, Detroit
Edwin Denby High School, Detroit
John J. Pershing High School, Detroit
Mackenzie High School, Detroit

N. Chester Sorensen, Detroit
Charles E. Chadsey High School, Detroit
Alexander Macomb Elementary School, Detroit
John J. Bagley Elementary School, Detroit

Henry H. Turner, Grand Rapids
Burton Junior High and Elementary School, Grand Rapids
Escanaba Junior High School, Escanaba
George A. Davis Technical High School, Grand Rapids

B. C. Wetzel & Co., Detroit
Copernicus Junior High School, Hamtramck
Andrew Jackson Junior High School, Detroit
Washington Elementary School, Wyandotte

Albert Wood, Jr., Detroit
James Gardner Grade School, Detroit
Davy Street Grade School, Detroit
Beech Street Grade School, Dearborn

Walter H. Wyeth, Port Huron
Roosevelt Junior High School, Port Huron
Armada High School, Armada
St. Augustine Parochial School, Richmond

MINNESOTA

W. L. Alban, St. Paul
High and Grade School, Cumberland, Wis.
Lincoln Grade School, Alice Lake, Wis.
High School, Stewartville

Boyum, Schubert & Sorenson, Winona
Central Grade School, Winona
Madison Grade School, Winona
St. Martin's Lutheran School, Winona

Croft & Boerner, Inc., Minneapolis
Washington Park High School, Racine, Wis.
Junior-Senior High School, Brainerd
Junior-Senior High School, Ironwood, Mich.

W. R. Dennis, Minneapolis
Addition to Fergus Falls High School, Fergus Falls
Addition to Park Region College, Fergus Falls
Grade and High School, Kelliher

Nairne W. Fisher, St. Cloud (also Dubuque, Iowa)
Clarke College, Dubuque, Iowa
Garfield School, St. Cloud
Mundelien College, Chicago, Ill.

Le Roy Gaarder, Albert Lea
Consolidated Grade and High Schools, Freeborn
Consolidated Grade and High Schools, Alden
New Grade School additions, Albert Lea

Hewitt & Brown, Inc., Minneapolis
Dunwoody Institute Group, Minneapolis
Blake School Group, Hopkins
Wayzata Consolidated School, Wayzata

William M. Ingemann, St. Paul
Macalester College Group, St. Paul (Associate Architect)
Dormitory, Gustavus Adolphus College, St. Peter
Dormitory for Men (designs and floor plans), University of Minnesota, Minneapolis

Jacobson & Jacobson, Minneapolis
Charles City School, Charles City, Iowa
Litchfield School, Litchfield
Granite Falls School, Granite Falls

C. H. Johnston, St. Paul
Cyrus Northrup Memorial Auditorium, University of Minnesota, Minneapolis
College of Dentistry, University of Minnesota, Minneapolis
State Teachers College, Moorhead

B. J. Knowles, Winona
High School Auditorium-Gymnasium, Winona (associated with Wm. B. Ittner, Inc., St. Louis, Mo.)
St. Thomas Parochial School, Winona
St. Mary's Parochial School, Fountain City

Lang, Raugland & Lewis, Minneapolis (also St. Paul)
New group of buildings, Luther Theological Seminary, St. Paul
School and Dormitory Building, Lutheran Bible Institute, Minneapolis
Grade School for Common School District No. 21, Golden Valley, Hennepin County

Longe & Thorshov, Inc., Minneapolis
Concordia College Group, St. Paul: new Campus layout, new Administration Building, Dormitory, and Refectory
Northwestern Bible School, Minneapolis

P. M. Olsen, Duluth
Junior High School, St. Cloud
Cotton High School, Cotton
Meadowlands School, Meadowlands

Geo. Pass & Son, & P. T. Rockey, Mankato
Franklin Grade and Junior High School, Mankato
Grade and High School, Le Sueur
High School, Windom

Louis C. Pinault, St. Cloud
Grade and High School, Cold Spring
Grade School, St. Joseph
Grade School, Wahpeton, N. Dak.

Albert G. Plagens, New Ulm
St. Anne's Parochial School, Wabasso
Boys' Dormitory, Dr. Martin Luther College, New Ulm
Community Building and High School Gymnasium, Glencoe

Frederick A. Schweiger, Moose Lake
High School, Moose Lake
Consolidated School Building, Willow River
Consolidated School Building, Kettle River

C. H. Smith, Duluth
Washburn Grade School, Duluth
Congdon Park Grade School, Duluth
Lincoln Junior High School addition, Duluth

Stebbins, Haxby & Bissell, Minneapolis
Excelsior Junior-Senior High School, Excelsior
High-Grade School, Alexandria (Ekman-Holm & Co., Associate Architects)
High-Grade School, Rush City (Ekman-Holm & Co., Associate Architects)

Sund & Dunham, Minneapolis
Detroit Lakes High School, Detroit Lakes
Howard Lake Grade and High School, Howard Lake
Edina Elementary School, Minneapolis

J. C. Taylor, Hibbing
Brooklyn Grade School, Hibbing
Parochial Junior High School, Hibbing
Cherry High School, Cherry

Toltz, King & Day, Inc., St. Paul
Dr. Martin Luther College Group, New Ulm
Grade and High School Buildings, South St. Paul
High School, New Prague

MISSISSIPPI

Harry North Austin, Jackson
Library, Millsaps College, Jackson
Science Building, Millsaps College, Jackson
Women's Building, Millsaps College, Jackson

Frank P. Gates Co., Jackson
School of Education and Demonstration High School, University of Mississippi, University
Graduate School Building, University of Mississippi
Law School Building, University of Mississippi

Hull & Malvaney, Jackson
Newton High School, Newton
Duncan High School, Duncan
Tougaloo College Group, Tougaloo

P. J. Krouse, Meridian
High School Building, Natchez
M. S. C. W. Group, Columbus: Dormitory, Dining Hall, Physical Education, Administration
High School, Clarksdale

C. H. Lindsley, Jackson
Home Economics and Hygiene Building, Mississippi State College for Women, Columbus
Agricultural Experiment Station, Agricultural and Mechanical College, Starkville
Administration Building, Delta State Teachers College, Cleveland

Wilfred S. Lockyer, Picayune
New group of buildings, Harrison-Stone-Jackson Agricultural High School and Junior College, Perkinston, Miss.: Auditorium, Science Department, Boys' Dormitory, Girls' Dormitory, Gymnasium, Power House, new dining-room and modern kitchen.

N. W Overstreet, Jackson
E. E. Bass Junior High School, Greenville
Booneville High School, Booneville
Brooklyn Academic Building, Brooklyn

Shaw & Woleben, Gulfport
Central Elementary School, Gulfport
Long Beach School, Long Beach
Elementary School, Belzoni

Vinson B. Smith, Jr., Gulfport
Three buildings, Mississippi State Teachers College, Hattiesburg
Two buildings, Industrial and Training School, Columbia
Administration Building, Perkinston Agricultural School and Junior College, Perkinston

J. M. Spain, Jackson
Administration Building, Blue Mountain College, Blue Mountain
Houston School, Houston
Drew High School, Drew

W. A. Stanton, Vicksburg
Carr Junior High School, Vicksburg
Oak Ridge School, Warren County
All Saints College (dormitory and auditorium), Vicksburg

MISSOURI

Ludwig Abt, Moberly
West Park School, Moberly
Junior High School, Moberly
Junior College, Moberly

Bonsack & Pearce, Inc., St. Louis
Ozark Wesleyan College, Carthage
Hardin College Group, Mexico
High School, Bonne Terre

Ernest O. Brostrom, Kansas City
Rock Creek Rural School, Independence
Raytown High School, Raytown
Educational Building, Presbyterian Church, Fort Scott, Kans.

Maurice Carroll, Kansas City
St. Mary's College, Notre Dame, Ind.
Christian Brothers High School, St. Joseph
St. Mary's College, Leavenworth, Kans.

Eckel & Aldrich, St. Joseph
New Central High School, St. Joseph
Two buildings, Missouri State School, Marshall
Group of buildings, Palmer College, Albany

Harry C. Eckland, Kansas City
Iowa Wesleyan College Group, Mt. Pleasant, Ia.
Bethany College Group, Lawrence, Kans.
High School, Muscatine, Ia.

Ben C. Elliott, Mexico
Mexico Junior and Senior High School, Mexico
Bellflower High School, Bellflower
St. Brendan's School, Mexico

Felt, Dunham & Kriehn, Kansas City
South Junior High School, Joplin
Eugene Field School, Maryville
Administration and Chapel Building, Tarkio College, Tarkio

Ferrand & Fitch, St. Louis
Dormitory, Library, and Music Building, Drury College, Springfield
Flynn Park Grade School, University City
Senior High School, University City (collaborating with Trueblood & Graf)

Frederick C. Gunn, Kansas City
Training School for Nurses, General Hospital, Kansas City
Training School and Clinic No. 2 (colored), General Hospital, Kansas City
Headquarters Building, Church of the Nazarene, Kansas City

Heckenlively & Mark, Springfield
Bolivar High School, Bolivar
Walnut Grove High School, Walnut Grove
Consolidated High School, Anderson

Hellmuth & Hellmuth, St. Louis
Sacred Heart School, Chicago, Ill.
School of the Immaculate Heart, Normandy
School of the Little Flower, St. Louis County

Hoener, Baum & Froese, St. Louis
Grade and High Schools, Jennings
Church School, Cape Girardeau
High School, Owensville

Wm. B. Ittner, Inc., St. Louis
Senior High School, Pottsville, Pa.
Lew Wallace School, Gary, Ind.
Junior High School, Elgin, Ill.

Jamieson & Spearl, St. Louis
Washington University, St. Louis
University of Missouri, Columbia
Stephens College, Columbia

La Beaume & Klein, St. Louis
Library, Lindenwood College, St. Charles
Washington University School of Dentistry, St. Louis
Second Presbyterian Church Educational Building, St. Louis

A. F. Lindsay, Cape Girardeau
Administration Building, Bethel College, McKenzie, Tenn.
High School, East Prairie
High School, Oran

F. A. Ludewig Co., St. Louis
St. Henry's College, Belleville, Ill.
Pontifical College Josephinum, Worthington, Ohio
St. Patrick's School, East St. Louis, Ill.

Madorie & Bihr, Kansas City
St. Augustine's Parochial School, Kansas City
St. Agnes Academy, Kansas City
St. John's Parochial School, Kansas City, Kans.

Malcolm S. Martin, Hannibal
Knox College Library, Galesburg, Ill.
Laura J. Pettibone School, Hannibal
Eugene Field School, Hannibal

Eugene R. Meier, St. Joseph
Girls' Dormitory, N. W. Missouri State Teachers College, Maryville
Addition to Blair School, St. Joseph
Webster Elementary School, St. Joseph

O'Meara & Hills, St. Louis
(also Detroit, Mich.)
Cretin High School, St. Paul, Minn.
Villa Duchesne (Girls' School), St. Louis County, Mo.
Precious Blood School, Detroit, Mich.

H. D. Pampel, Kansas City
North Kansas City High School, North Kansas City
Brookfield High and Grade School, Brookfield
Holton High School, Holton, Kans.

Sayler & Owen, Kansas City
High School, Excelsior Springs
High School, Olanthe, Kans.
Young Hall (dormitory), Missouri Valley College, Marshall

Chas. A. Smith, Kansas City
Lincoln High School, Kansas City
Border Star School, Kansas City
Horace Mann Teachers Training School, Pittsburg, Kans.

Henry C. Smith, Independence
Graceland College Group, Lamoni, Iowa
Kappa Sigma Fraternity House, Lawrence, Kans.
Alpha Chi Omega Sorority House, same

Study & Farrar, St. Louis
Mary Institute, St. Louis County
Teachers Training School, Southeast Missouri State Teachers College, Cape Girardeau
Sappington Grade School, Sappington

Wilbur T. Trueblood & Hugo F. Graf, St. Louis
Group of five buildings, Central College, Fayette
High School, University City
Nurses Training School, Washington University, St. Louis

H. E. Wagenknecht, St. Joseph
High School, Clarence
High School, Welda, Kans.
Grade School, St. Joseph

MONTANA

Bird & van Teylingen, Great Falls
Great Falls High School, Great Falls
Conrad High School, Conrad
Roosevelt Grade School, Great Falls

Fred A. Brinkman, Kalispell
Shelby High School, Shelby
South Side School, Kalispell
High School Gymnasium, Cut Bank

J. G. Link, Billings (also Helena, Mont., and Medford, Ore.)
McKinley School, Butte
Fergus County High School, second unit, Lewistown
Hot Springs High School, Hot Springs, S. Dak.

McIver and Cohagen, Great Falls (also Billings)
Library, University of Montana, Missoula
Library, Normal School, Dillon
High School, Cody, Wyoming

George H. Shanley, Great Falls
Anaconda Junior High School, Anaconda
Junior and Senior High School, Glasgow
Entomology Laboratory, Hamilton

NEBRASKA

Arthur D. Baker, Grand Island
Senior High School, Grand Island
Junior-Senior High School, Cozad
Girls' Dormitory, Nebraska State Teachers, Wayne

George A. Berlinghof, Lincoln
High School, McCook
High School, Hebron
High School, Ong

N. R. Brigham, Omaha
Pershing Grade and Junior High School, East Omaha
Underwood Grade and Junior High School, Omaha
Monroe Grade School, Omaha

Frederick W. Clarke, Omaha
Sherman School, Omaha
Grade School, Central City
Omaha Technical High School, Omaha (with Edwin B. Clark)

Leo A. Daly, Omaha
High School and Grade School, Bonacum Institute, Lincoln
Faculty Building remodeled and enlarged, Creighton University, Omaha
New group of buildings, St. Columban's Preparatory Seminary, near Silver Creek, N. Y.

Davis & Wilson, Lincoln
Field House and Stadium, University of Nebraska, Lincoln
Kearney Junior High School, Kearney
Everett Junior High School, Lincoln

Everett S. Dodds, Omaha
Petersburg Grade and High School, Petersburg
Elkhorn Grade and High School, Elkhorn
Pilger School, Pilger

Marcus L. Evans, Hastings
Elementary School, Hastings
Elementary School, Culbertson
Elementary School, Indianola

E. L. Goldsmith & Co., Scottsbluff
Minatare High School, Minatare
Orleans High School, Orleans
Hemingford School, Hemingford

George Grabe, Fremont
Genoa Public School, Genoa
Wakefield Public High School, Wakefield
Cedar Rapids Public School, Cedar Rapids

J. P. Helleberg, Kearney
State Training School, Kearney
Lexington High School, Lexington
Overton High and Grade School, Overton

Lahr & Stangel, Omaha
Father Flanagan's Boys' Home, Omaha
Notre Dame Academy, Omaha
St. Boniface Grade and High School, Westphalia, Iowa

Meginnis & Schaumberg, Lincoln
Student Activities Building, Lincoln
Irving Junior High School, Lincoln
North Platte High School, North Platte

J. M. Nachtigall, Omaha
St. Joseph's Grade and Junior High School, Omaha
Duchesne College, Omaha
St. Benedict's Grade School, Omaha

George B. Prinz, Omaha
Dormitory, Brownell Hall, Omaha
Benson-West School, Omaha
Grade-High School, Valley

Chas. W. Steinbaugh, Omaha
Washington Grade School, Omaha
High School, Manning, Iowa
Walnut Hill Grade School, Omaha

Jas. C. Stitt, Norfolk
Training School, State Normal College, Chadron
Library, State Normal College, Chadron
Auditorium-Gymnasium, Newman Grove School, Newman Grove

NEVADA

F. J. DeLongchamps, Reno
Educational Building, University of Nevada, Reno
Sparks Junior High School, Sparks
Elko Grammar School, Elko

George A. Ferris & Son, Reno
Las Vegas High School, Las Vegas
B. D. Billinghurst Junior High School, Reno
Fourth Street Junior High School, Reno

NEW HAMPSHIRE

E. T. Huddleston, Durham
University of New Hampshire, Durham:
Murkland Hall (classroom building)
Charles James Hall (chemistry building)
Charles Harvey Hood House (infirmary)

Jens Fredrick Larson, Hanover
Group of buildings and plan, Dartmouth College, Hanover
Group of buildings and plan, Colby College, Waterville, Maine
Group of buildings and plan, Wabash College, Crawfordsville, Ind.

J. Edward Richardson, Dover
Dover High School Annex, Dover
Exeter High School, Exeter
Berwick High School, Berwick, Me.

Wells and Hudson, Hanover
South End Platoon School, Concord
Additions to Senior High School, Berlin
Dormitory, Colby School for Girls, New London

NEW JERSEY

Charles F. Ackerman, Newark
Blessed Sacrament School, Elizabeth
St. Elizabeth's School, Linden
Public School, Essex Fells

Ernst A. Arend, Asbury Park (also New York City)
Asbury Park High School, Asbury Park
Long Branch High School, Long Branch
Leonardo Grade School, Leonardo

Rolf William Bauhan, Princeton
Hun School Group, Princeton
Solebury School Group, New Hope, Pa.
Princeton Preparatory School Group, Princeton

H. B. Brady, Inc., Elizabeth
Thomas Jefferson Senior High School, Elizabeth
Additions to Senior High School, Linden
Senior High School, Roselle Park

G. W. Brooks, Perth Amboy and Atlantic City
Sacred Heart School, New Brunswick
Our Lady of the Valley School, Orange
Holy Spirit High School, Atlantic City

Clinton B. Cook, Asbury Park
Addition to Toms River School, Toms River
Junior High and Vocational School, Lakewood
Grade School, Island Heights

J. Frederick Cook, Newark
School of Law, St. John's College, Brooklyn, N. Y.
First Avenue School, Newark
St. John's College High School, Brooklyn, N. Y.

Henry Barrett Crosby, Paterson
Grammar School No. 6, Paterson
Grammar School No. 13, Clifton
Grammar School No. 15, Clifton

Arthur E. Doré, Hackensack
High School addition, Westwood
Elementary School, Bergenfield
Elementary School, Hackensack

Vincent J. Eck, Red Bank
Red Bank Catholic High School, Red Bank
St. Paul's Parochial School, Princeton
St. Joseph's Parochial School, North Plainfield

Edwards & Green, Inc., Camden
Bridgeton Junior and Senior High School, Bridgeton
Gloucester City High School (for Board of Education), Gloucester City
J. Heulings Coles School (for Board of Education), Delaware Township, Camden County

Fred A. Elsasser, Union
Union High School, Union
Abraham Clark High School, Roselle
Washington School, Union

Fanning & Shaw, Paterson
Monroe Street Elementary and Junior High School, Ridgewood
Addition to Ridgewood High School, Ridgewood (Egerton Swartwout, Associate Architect)
Mount St. Dominic Academy, Caldwell

The P. L. Fowler Co., Trenton
Bordentown High School, Bordentown
Grammar School No. 1, Florence
Slackwood School, Lawrence Township, Mercer Co.

Greisen & Tuzik, Perth Amboy
Keasbey Public School addition, Keasbey
Middlesex County Vocational School No. 2, Perth Amboy
Addition to Perth Amboy High School, Perth Amboy

Guilbert & Betelle, Newark
Columbia High School, South Orange and Maplewood
High School, Great Neck, N. Y.
High School, New Rochelle, N. Y.

Hacker & Hacker, Fort Lee
Senior High School, Teaneck
Junior High School, West Orange
Lindbergh School, Palisades Park

Joseph Norman Hettel, Camden
Camden County Vocational School, Pensauken Township
Philadelphia College of Osteopathy, Philadelphia, Pa.
High School, Hammonton

Hill & Brennfleck, Trenton
High School, Salem
Witherspoon Street School, Princeton
Hopewell Grade School, Bridgeton

John F. Kelly, Passaic
Thomas Jefferson School, Passaic
Memorial School, Passaic
Slovak Catholic School and Gymnasium, Passaic

Lee & Hewitt, Paterson (also New York City)
Clifton High School, Clifton
School No. 25, Paterson
Tenakill School, Closter

Lucht & Anderson, Cliffside Park
Presbyterian Church School, Leonia
Trinity Evangelical Lutheran Church School, Hudson Heights
Swedish Evangelical Mission Church School, West New York

Wm. Mayer, Jr., West New York
Memorial High School, West New York
Public School No. 1, West New York
Public School No. 5, Cliffside Park

B. Francis McGuire, Teaneck
Midland School No. 1, Midland Township
Monastery and school for Capuchin Fathers, New York City
Evans Preparatory School, Norfolk, Va.

Alexander Merchant & Son, New Brunswick
Junior High School, Highland Park
Freehold High School, Freehold
Middlesex County Vocational School No. 1, New Brunswick

Arnold H. Moses, Camden
Audubon High School, Audubon
Pensauken Junior High and Grade School, Pensauken Township
Merchantville High School, Merchantville

John Noble Pierson & Son, Perth Amboy
New Market School, Piscataway Township
Somerville School, Somerville
Barnegat High School, Barnegat

C. Godfrey Poggi & William B. Bragdon, Elizabeth
Public School No. 8, Hillside
Junior High School, Dunellen
St. Michael's Parochial School, Cranford

F. Herbert Radey, Camden
Collingswood High School Stadium, Collingswood
Mantua School, Mantua
Gibbstown School, Gibbstown

Office of Ernest Sibley, Palisade
Senior High School, Trenton
Heywood Avenue School, Orange
Men's Dormitory and Commons, St. Lawrence University, Canton, N. Y.

Simpson & Rolston, Inc., Newark
Buckley School (private), Greenvale, N. Y.
Buckley School (private), Rumson
High School, Mechanicville, N. Y.

Wm. W. Slack & Son, Trenton
Lincoln Elementary and Intermediate School, Trenton
Junior High School, Oxford Furnace
Rider College, Trenton

Vivian B. Smith, Atlantic City
Ocean City High School, Ocean City
Wildwood High School, Wildwood
Margate School, Margate

Victor H. Strombach, Irvington
Chancellor School, Irvington
Berkeley School, Irvington
Junior High School, Irvington

John C. Van Vlandren, Paterson
Public School No. 20, Paterson
Memorial School, Totowa
Eastern Academy, Paterson

Jacob J. Vreeland, Dover
Lincoln School, Rockaway
Denville School, Denville Township
Blairstown School, Blairstown Township

Wentworth & Vreeland, Paterson
School No. 13, Paterson
Wayne School, Wayne Township
Monroe High School, Monroe, N. Y.

NEW MEXICO

Gaastra & Gladding, Albuquerque (also Santa Fe)
Grants Union High School, Grants
Monte Vista Grade School, Albuquerque
State Reform School, Springer

John Gaw Meem, Santa Fe
Douglas Avenue Grammar School, Las Vegas
Los Alamos Ranch School, Santa Fe
Fountain Valley School, Colorado Springs, Colo.

George Williamson, Inc., Albuquerque
New Mexico School for Deaf, Santa Fe
New Mexico School for Blind, Alamogordo
Manual Arts-Albuquerque High School, Albuquerque

NEW YORK

Adams & Prentice, New York (also Hartford, Conn.)
Gardner House, The Brooks School, North Andover, Mass.
West Middle School, Hartford, Conn. (Carl J. Malmfeldt, Associate Architect)
Richard E. Byrd School, Glen Rock, N. J. (Harold E. Paddon, Associate Architect)

William Adams, New York City
North Bellmore Public School, North Bellmore
Bellmore School, Bellmore
Hessel Memorial Hall, Woodmere Academy, Woodmere

Carl C. Ade, Rochester
Watkins Glen High School, Watkins Glen
Bolivar High School, Bolivar
Penn Yan Junior High School, Penn Yan
Fayetteville High School, Fayetteville

Associated Buffalo Architects, Inc., Buffalo
Lewis J. Bennett High School, Buffalo
Public School No. 31, Buffalo
Public School No. 71, Buffalo

E. G. Atkinson, Schenectady
Greenport School, Greenport,
Central School, District No. 1, Lebanon Springs
Van Antwerp School, Niskayuna

Bagg & Newkirk, Utica
East Utica High School, Utica
Chemistry Building, Hamilton College, Clinton
Oriskany Central School, Oriskany

Dwight James Baum, Riverdale-on-Hudson
Hendricks Chapel and Citizenship Building, Syracuse University, Syracuse
Administration Building, Wells College, Aurora
Science Building, Hartwick College, Oneonta

Beck & Tinkham, Jamestown
Love Elementary School, Jamestown
Jefferson Junior High School (Guilbert & Betelle, Associates) Jamestown
Board of Education Administration Building, Jamestown

Edward J. Berg, Utica
Our Lady of Lourdes School, Utica
Academy Field House, Utica
Church of Annunciation School, Ilion

Francis J. Berlenbach & Sons, Brooklyn
Wharton Memorial (school and dormitory for mentally defective children), St. Charles Hospital, Port Jefferson, L. I.
Our Lady of the Miraculous Medal Parochial School, Borough of Queens, New York City
St. Theresa Parochial School, Woodside, Borough of Queens, New York City

Wesley Sherwood Bessell, New York City
Mount Vernon Seminary, Washington, D. C.
Public School, Port Washington
Public School, Freeport

Gerard W. Betz, Kingston
Grade and High School, Walden
Grade School, Glasco
High School and Manual Training Building, Kingston

Frank H. Bissell, New York City
St. Gabriel's School, New Rochelle
Roger Ludlow Junior High School, Norwalk, Conn.
Rye Neck High School, Mamaroneck

Walter D. Blair, New York
University of Virginia, Charlotteville (John K. Peebles, R. E. Lee Taylor and Edmund Campbell, Associate Architects):
Dormitory Group
Monroe Hall
Law School

Bley & Lyman, Buffalo
Canisius College Group, Buffalo
Lackawanna School Program, Lackawanna
Holland Central School, Holland

R. L. Bowen, Schenectady
Mt. Pleasant High School, Schenectady
Oneida Intermediate School, Schenectady
Euclid Elementary School, Schenectady

Clarence W. Brazer, New York (also Chester, Pa.)
Group of buildings, Crozer Theological Seminary, Upland, Pa.
Group of buildings, Pennsylvania Military College, Chester, Pa.
Glen-Nor High School, Glenolden, Pa.

A. L. Brockway, Syracuse
John T. Roberts Grade and Grammar School (including auditorium and gymnasium), Syracuse
Le Moyne Grade and Grammar School (including auditorium and gymnasium), Syracuse
Syracuse Central High School, Syracuse

Frank Burkhard, New York City
Nativity School, Poughkeepsie
St. Joseph's School, New York City
Villa Maria Academy, The Bronx, New York City

Charles A. Carpenter, Rochester
Phelps Union and Classical School, Phelps
Departmental Church School, Christ Episcopal Church, Poughkeepsie
Departmental Church School, First Methodist Episcopal Church, Lockport

Paul Cerrina, New Rochelle
Salesian Boys School, Goshen
Salesian Seminary, Newton, N. J.
Gymnasium Building, Salesian High School, New Rochelle

G. Howard Chamberlin, Yonkers
Roosevelt High School, Yonkers
Benjamin Franklin School, Yonkers
Longfellow School, Yonkers

Walter B. Chambers, New York City
Bingham and McClellan Halls (dormitories), Yale University, New Haven, Conn.
Lawrence Hall (lecture) and Stillman Hall (dormitory), Colgate University, Hamilton
McGregory Hall (Chemistry Laboratory) Colgate University, Hamilton

Carl W. Clark, Cortland
Williamson Central School, Williamson
Newark Valley Central School, Newark Valley
Manlius High School, Manlius

Coffin & Coffin, New York City
Benjamin Franklin School, Westfield, N. J.
Group of buildings, El Instituto Ingles, Santiago, Chile
Two Elementary Schools, Greenwich, Conn.

George W. Conable & Leon H. Smith (Schirmer & Schmidt, Associate Architects), New York City
Administration Building, Lecture Halls and Dormitory, Wagner College, Staten Island
Cortland High School, Cortland
North Side School, East Williston

Conrad & Cummings, Binghamton
Benjamin Franklin School, Binghamton
Alexander Hamilton School, Binghamton
West Corners School, Union

Corbett, Harrison & MacMurray, New York City
Far Rockaway High School, New York City (Associate Architects)
DeWitt Clinton High School, New York City (Associate Architects)
Theodore Roosevelt High School, New York City (Associate Architects)

Howard F. Daly, Amsterdam
Senior High School, Amsterdam
Clizbe Avenue Grade School, Amsterdam
Junior High School, Amsterdam

R. H. Dana, Jr., New York City
New building for the Dalton Schools, Inc., New York City
Group of five buildings, Gunnery School, Washington, Conn.
Loomis School, Windsor, Conn.

Delano & Aldrich, New York City
Library Building, Lawrenceville School, Lawrenceville, N. J.
Yale Divinity School, Yale University, New Haven, Conn.
Chapel and Dormitory, Hotchkiss School, Lakeville, Conn.

Andrew L. Delehanty, Albany
School No. 26, Albany
St. Theresa Parochial School, Albany
Arbor Hill Junior High School, Albany

DePace & Juster, New York City
Mt. Carmel School, Elmsford
Loretta School and Center, New York City
R. C. Orphanage and School, Gladstone, N. J.

Dietel & Wade, Buffalo
St. Thomas Aquinas School, Buffalo
Orphan Asylum School, Buffalo
Christ the King School, Buffalo

O. W. & H. B. Dryer, Rochester
Fairport High School, Fairport
Honeoye Falls Grade and High School, Honeoye Falls
Addition to East Rochester Grade School, East Rochester

F. Ferdinand Durang, New York City
Mercyhurst College, Erie, Pa.
St. Michael's Parochial School, Union, N. J.
St. Robert's Parochial School, Chester, Pa.

Raymond A. Freeburg, Jamestown
Central High and Grade School, Randolph
High School, Hilton
Junior and Senior High School, Falconer

Frank Frey, Rochester
Immaculate Conception School, Rochester
St. Ambrose School, Rochester
Corpus Christi School, Rochester

Fuller & Robinson Co., Albany
Albany Law School, Albany
Franklin Academy, Malone
Walter A. Wood High School, Hoosick Falls

August Henry Galow, Huntington
Lincoln School, Huntington Station
Franklin Square School, Hempstead
Central School, South Huntington

Clarence H. Gardinier, Albany
High and Grade School, Kinderhook
High and Grade School, Staatsburg
Junior High School, Rensselaer

William Gehron, New York City
Educational Building, Harrisburg, Pa. (Gehron & Ross, Associate Architects)
Jewish Theological Seminary, New York City (Gehron & Ross, Associate Architects)
Group of buildings at Denison University, Granville, Ohio (Gehron & Ross, Associate Architects)

Arthur N. Gibb, Ithaca
Henry St. John School, Ithaca
Ludlowville High School, Ludlowville
Junior High School, Ithaca

Archibald F. Gilbert, New York City
Lowville Academy and Grade School, Lowville
Alexandria Bay Grade and High School, Alexandria Bay
Granville High School, Granville

Thomas L. Gleason, Albany
Schoharie High School, Schoharie
Public School No. 27, Albany
Addition, Public School No. 23, Albany

Wm. H. Gompert, New York City
New York Training School for Teachers, New York City
DeWitt Clinton High School, New York City
Theodore Roosevelt High School, New York City

Goodwillie & Moran, New York City (also Glen Ridge, N. J.)
Memorial Parish School, Orange
Linden Avenue School, Glen Ridge
Central Grade School, Glen Ridge

Gordon & Kaelber, Rochester
New group of twelve buildings, Mens College, University of Rochester, Rochester
Meharry Medical College, Nashville, Tenn.
Benjamin Franklin Junior-High School, Rochester

Robert R. Graham, Middletown
Central Grade and High School, Hancock
Central Grade and High School, Richmondville
Central Valley Junior High and Grammar School, Central Valley

Edward B. Green & Sons, Buffalo
Crosby Hall; Central Heating Plant; Book Store Building, University of Buffalo, Buffalo
Nichols Country Day School for Boys, Buffalo
Kibler High School, Tonawanda

Edward Hahn, Hempstead
Mamaroneck High School, Mamaroneck
West Babylon School, West Babylon
Sunrise Park School, Wantagh

Earl Hallenbeck, Syracuse
Cazenovia Central School, Cazenovia
Fabius Central School, Fabius
Henderson Central School, Henderson

Harbach & Kideny, Buffalo
Amherst Central High School, Snyder
Amherst District No. 18 School, Snyder
Marilla District No. 1 School, Marilla

Haskell & Considine, Elmira
Public School No. 4, Elmira
Horseheads Junior and Senior High School, Horseheads
St. Cashmere's Parochial School, Elmira

I. Edgar Hill, Geneva
Coxe Hall, Hobart College, Geneva
High School, Andover
Dormitory Building, Hobart College, Geneva

Hillger & Beardsley, Auburn
Auburn Senior High School, Auburn
Addition to Fulton School, Auburn
School of Religious Education, Second Presbyterian Church, Auburn

Hood & Fouilhoux, New York City
Dormitory, School and Chapel, St. Vincent de Paul Asylum, Tarrytown
Dormitory, Peabody College, Nashville, Tenn.

Howe & Lescaze, New York (also Philadelphia, Pa.)
Edgewood School, Greenwich, Conn.
Oak Lane Country Day School, Philadelphia, Pa.
Hessian Hills School, Croton-on-Hudson

John Mead Howells, New York City
Pratt Auditorium, Brooklyn
Science and Technology Building, Pratt Institute, Brooklyn
Chapel and dormitories, Wooster School, Danbury, Conn.

Hudson & Hudson, Buffalo
West Seneca High School, West Seneca
West Seneca School Annex, West Seneca
Orchard Park Central School, Orchard Park

Paul Hueber, Syracuse
Blessed Sacrament School, Syracuse
St. Brigiol's School, Syracuse
St. Mary's School, Rome

Alvin W. Inman, Plattsburg
Plattsburg Junior High School, Plattsburg
Dannemora High School, Dannemora
Ausable Forks Central Rural School, Ausable Forks

Louis E. Jallade, New York City
Physical Education Building, University of Delaware, Newark, Del.
Physical Education Building, Skidmore College, Saratoga Springs
Grade School, Scarsdale

Oliver R. Johnson, Jamestown
Addition to Friendship High School, Friendship
Westfield High School addition, Westfield
Vocational School, No. 10, Dunkirk

William H. Jones, Yonkers
Parochial School for the Parish of St. Denis, Yonkers
Church and School of the Blessed Sacrament, The Bronx, New York City
Parochial School of Saint Margaret, The Bronx, New York City

L. J. Kaley, Binghamton
Hooper School addition, Endwell
Christopher Columbus School, Binghamton (Associate Architect)
Addition to Woodrow Wilson School, Binghamton

F. J. & W. A. Kidd, Buffalo
East High School, Buffalo
Riverside High School, Buffalo
Kenmore High School, Kenmore

Office of D. D. Kieff, Watertown
West Carthage High School, Carthage
Edwards High School, Edwards
Massena School, Massena

Beverly S. King, New York City
Administration Building, Lincoln College, Lincoln, Ill.
Science Hall, Lincoln College, Lincoln, Ill.
The Pingrey School, Elizabeth, N. J.

Melvin L. King, Syracuse
Forest Hill Drive School, Syracuse
John Van Duyn School, Syracuse
Solvay High School, Solvay

Kinne & Frank, Utica
Lewis Rutherford Morris Central School, Morris
Canajoharie High School, Canajoharie
Grade School, Oneonta

Frank W. Kirkland, Rome
Columbus Grade School, Rome
DeWitt Clinton Grammar and Grade School, Rome
Forestport Union Free School, District No. 10, Forestport

Kirkpatrick & Cannon, Niagara Falls
Trott Vocational School, Niagara Falls
Niagara University Group, Niagara Falls: Dormitory Group, Gymnasium
La Salle Junior High School, Niagara Falls

A. Lawrence Kocher, New York City
Grade School, Pennsylvania State College, State College, Pa.
Dairy Barn, same
Grade School, Berwick, Va.

A. T. Lacey & Son, Binghamton
East Junior High School, Binghamton
Addition to High School, Endicott
West Junior High School, Binghamton

William I. La Fon, Jr., Southampton
Southampton High School, Southampton
Eastport High School, Eastport
Bellport Grade School, Bellport

Lansing & Greene, Watertown
South Junior High School, Watertown
North Junior High School, Watertown
Potsdam High School, Potsdam

Simon Larke & Russell G. Larke, Niagara Falls
Hyde Park Grade School, Niagara Falls
Charles B. Gaskill Junior High School, Niagara Falls (Simon Larke, Architect; J. R. White and Russell G. Larke, Associates)
Niagara Falls High School, Niagara Falls (Simon Larke, Chairman, associated with C. F. Obenback and Associated Architects)

Lee & Hewitt, New York City (also Paterson, N. J.)
Clifton High School, Clifton, N. J.
School No. 15, Paterson, N. J.
Tenakill School, Closter, N. J.

Electus D. Litchfield, New York City
Macalester College Group, St. Paul, Minn.: General Group Plan for future development; Boys' Dormitory, Gymnasium, and Power House

George F. Lorenz, Rochester
Holy Cross School, Rochester
St. Stanislaus School, Rochester
St. Margaret Mary School, Rochester

Oscar Lowinson, New York City
Marion Street School, Lynbrook
Atlantic Avenue School, Lynbrook
Uniondale School No. 2, Uniondale

Office of Henry J. McGill, New York City
Group of seven buildings, College of New Rocnelle, New Rochelle
Our Lady of Lourdes School, Queens Village
Blessed Sacrament School, Jackson Heights

W. Philip McGovern, New York City
St. Francis' College, Brooklyn
St. Mark's School, Sheepshead Bay
Chaminade High School, Mineola

McKenna & Irving, New York City
St. Clement's Parochial School, South Ozone Park
Brooklyn Preparatory High School, Brooklyn
Our Lady of Victories Parochial School, Jersey City, N. J.

McKim, Mead & White, New York City
Alumni Athletic Building, Wesleyan University, Middletown, Conn.
Dormitory, Trinity College, Hartford, Conn.
Clock and Bell Tower, University of North Carolina, Chapel Hill, N. C.

E. P. Mellon, New York City (also Pittsburgh, Pa.)
Group of buildings, Shady Side Academy, Pittsburgh, Pa.
Group of buildings, Pennsylvania College for Women, Pittsburgh, Pa.
Memorial Library, Choate School, Wallingford, Conn.

Henry Killam Murphy, New York City
Hopkins Grammar School, group of new buildings, New Haven, Conn.
Group of new buildings, Yenching University, Peiping, China
Ginling College group of new buildings, Nanking, China

Murphy and Lehmann, Brooklyn
St. Agnes' Seminary, Brooklyn
Resurrection School, Rye
Our Lady of Guadalupe School, Brooklyn

Leland Henry Niles, Amsterdam
Vrooman Avenue School, Amsterdam
Fifth Ward School, Amsterdam
District No. 2 School, Amsterdam

Charles F. Obenbach, Niagara Falls
Hyde Park Junior High School, Niagara Falls (associated)
Niagara Street Grade School, Niagara Falls (associated)
Administration Building, Board of Education, Niagara Falls

James W. O'Connor, New York City
All Hallows Institute, New York City
St. Barnabas School, Bellmore
St. Joseph's Normal Institute, Barrytown

E. Dean Parmelee, New Rochelle
Central School addition, Mamaroneck
Mamaroneck Avenue School Annex, Mamaroneck
Murray Avenue School Annex, Larchmont

Peabody, Wilson & Brown, New York City
Westbury High School, Westbury
Grade School, Cold Spring Harbor
Grade School, Woodbury

Pember & Demers, Albany
Utica Country Day School, New Hartford
St. Agnes School, Albany
West Rutland High School, West Rutland, Vt.

Chester R. Phelps, Niagara Falls
North Junior High School, Niagara Falls
Niagara Street School, Niagara Falls
Lewiston Grade and High School, Lewiston

Pierce & Bickford, Elmira
Parley Coburn School, Elmira
South Side High School, Elmira
Elm Street School, Waverly

Charles A. Platt, New York City
Library, University of Illinois, Urbana, Ill.
Architectural Building, University of Illinois, Urbana, Ill.
George Washington Hall, Phillips Academy, Andover, Mass.

Polhemus & Coffin, New York City
Choate School, Wallingford, Conn.:
Dormitory
Physics Laboratory
Gymnasium (H. W. Andrews, Engineer)

John Russell Pope, New York City
Plan and buildings, Syracuse University, Syracuse (Dwight James Baum, Associate Architect)
Plan and buildings, Dartmouth College, Hanover, N. H. (Larson & Wells, Associate Architects)
Plan and buildings, Hartwick College, Oneonta (Dwight James Baum, Associate Architect)

Cyrus K. Porter & Sons, Buffalo
Foster Hall, University of Buffalo, Buffalo (McKim, Mead & White, Associate Architects)
Edmund Hayes Hall, University of Buffalo, Buffalo
17th Street School, Niagara Falls

Wilson Potter, New York City
High School, Peekskill
High School, Geneva
High School, Oneida

Randall & Vedder, Syracuse
Sayre High School, Sayre, Pa.
Washington Irving Grade School, Syracuse
Frazer Grade School, Syracuse

Rasmussen & Wayland, New York City
Bernardsville High School, Bernardsville, N. J.
Allendale Grade School, Allendale, N. J.
Wilson Borough Junior-Senior High School, Easton, Pa.

Victor Reeser, Inc., New York City
Group of buildings, St. Joseph's School for the Instruction of the Blind, Jersey City, N. J.:
School and Home for Adults
School and Dormitory for Boys
School and Dormitory for Girls

Robert J. Reiley, New York City
St. Joseph's Academy, Brentwood
Immaculate Conception Seminary, Huntington
Holy Trinity School, Mamaroneck

Marcus T. Reynolds; Kenneth G. Reynolds, Associate, Albany
School Four, Albany
William S. Hackett Junior High School, Albany
Albany Academy Group, Albany

Ralph M. Rice, New York City
West Street Grade School, Newburgh
Chestnut Street School, Newburgh
Addition to Beacon High School, Beacon

Palmer Rogers, New York City
Northside High School, Corning
High School and Grade School, Addison
High School and Grade School, Sidney

Rossiter & Muller, New York City
Foxmeadow Grade School, Scarsdale
Scarsdale High School, Scarsdale
Edgewood School, District No. 1, Scarsdale

William L. Rouse, New York City
School and Settlement House, Federation Settlement House, New York City
School and Settlement House, The Madison House, New York City
Addition to Hebrew Technical Institute, New York City

J. M. Ryder, Schenectady
Scotia High School, Scotia
St. Johnsville High School, St. Johnsville
Stillwater High School, Stillwater

Francis R. Scherer, Rochester
Frank Fowler Dow School No. 52, Rochester
Charles Carroll School No. 46, Rochester
Charlotte Junior-Senior High School, Rochester

A. F. A. Schmitt, New York City
Immaculate Conception School, New York
St. Pius School, New York City
Capuchin College, Garrison

A. W. E. Schoenberg, Olean
Ellicottville High School, Ellicottville
Richburg High School, Richburg
Belmont High School, Belmont

Frederick J. Schwarz, New York City
St. Joseph's Roman Catholic School, Bayonne, N. J.
Holy Trinity School, Yonkers
Holy Rosary Roman Catholic School, Passaic, N. J.

Alexander Selkirk, Albany
Grade and High School, Delmar
Albany College of Pharmacy, Albany
Grade and High School, Coeymans

Albert M. Skinner, Watertown
Cooper School, Watertown
Washington and Lincoln Schools, Ogdensburg
Sacket Harbor High School, Sacket Harbor

Edward C. Smith, Poughkeepsie
Christopher Columbus Grade School (Public School No. 3), Poughkeepsie
Warring Grade School (Public School No. 10), Poughkeepsie
Grade and High School, Arlington

Smith & Stickney, Rochester
Hamlin Grade School, District No. 6, Hamlin
Greece Grade School, District No. 5, Greece
Manchester High School, District No. 8, Manchester

Smith & Ward, New York City
West End School, Long Beach
East End School, Long Beach
Park Street School, Long Beach

Frank A. Spangenberg, Buffalo
Seneca Vocational School, Buffalo
Hamburg High School, Hamburg
Grade and High School, Clifton Springs

W. H. Spaulding, Jamaica
Grade School, Union Free School District No. 27, West Hempstead
Grade School, Union Free School District No. 16, Elmont
Grade School, Union Free School, District No. 9, Williston Park

Starrett & Van Vleck, New York City
White Plains High School, White Plains
Isaac E. Young Junior High School, New Rochelle
George Innes Junior High School, Montclair, N. J.

Philip Steigman, Brooklyn
Yeshiva D'Brooklyn (High School and College), Brooklyn
Yeshiva Torah Vo-Daath (High School and College), Brooklyn
Yeshiva Isaac Jacob Reiners (High School and College), Brooklyn

Gustave E. Steinback, New York City
St. Joseph's College for Women, Brooklyn
St. Benedict's School, New York City
Quigley Memorial Seminary, Chicago, Ill. (Joseph W. McCarthy, Associate Architect)

Stoughton & Stoughton and **Stoughton & Plock,** New York City (also Winnipeg, Canada)
Polytechnic Institute of Porto Rico, San German, P. R.:
Girls' Dormitory
Boys' Dormitory
Commons
Buildings for the University of Manitoba, Winnipeg

Herbert C. Swain, Buffalo
Eden High School, Eden
Silver Springs High School, Silver Springs
Newfane High School, Newfane

Thomas & Baker, New York City
Auditorium, Albany Teachers College, Albany
Buffalo Teachers College, Buffalo
Students' Classroom Building, Albany Teachers College, Albany

Thompson, Holmes & Converse, New York City
New group of buildings, Hunter College of the City of New York, New York City (associated with Charles B. Meyers, New York City)
School of Business, College of the City of New York, New York City
Dalton High School, Dalton, Mass.

Edward Lippincott Tilton, New York City
Welch Medical Library, Johns Hopkins University, Baltimore, Md.
Central High School, Johnstown, Pa.
Caflisch Memorial Hall, Allegheny College, Meadville, Pa.

Tooker & Marsh, New York City
High School, Oyster Bay
High School, Port Chester
Grade School, New Rochelle

Wm. B. Tubby, New York City
Roslyn High School, Roslyn
Roslyn Grade School, Roslyn
Bedford Junior High School, Westport, Conn.

Hobart B. Upjohn, New York City
Group of eight buildings, North Carolina State College, Raleigh, N. C.
Group of five buildings, St. Catherine's School for Girls, Richmond, Va.
Two dormitories, Salem College, Winston-Salem, N. C.

B. P. Valkenburgh, Middletown
Warwick High School, Warwick
Annex to South Fallsburg High School, South Fallsburg
Annex to Otisville High School, Otisville

W. Brown Van Dreser, Gloversville
New Junior High School, Gloversville
Estee High School, Gloversville
Junior High School, Johnstown

John V. van Pelt, New York City
Gennadeion Library Group and Residence Hall, American School of Classical Studies in Athens (Van Pelt and Thompson)
Church School and Rectory of the Church of the Guardian Angel, New York City
School and Convent, Church of the Immaculate Conception, Tuckahoe

Robert P. Vignola, Harrison
Silver Lake Grade School, Harrison
Halstead Avenue School, Harrison
Purchase Grade School, Harrison

Theodore Visscher & James Burley, New York City
James Ward Packard Laboratory of Electrical and Mechanical Engineering, Lehigh University, Bethlehem
University Library, Lehigh University, Bethlehem
Science Building, Hampden-Sidney College, Hampden-Sidney, Va.

C. Edward Vosbury, Binghamton
Johnson City High School, Johnson City
Theodore Roosevelt School, Johnson City
Palm Harbor School, Clearwater, Fla.

D. Everett Waid, New York City
Gymnasium, Girls' Dormitory and Chapel, Monmouth College, Monmouth, Ill.
President's House, Men's Dormitory and Administration Building, College of Wooster, Wooster, Ohio

F. B. & A. Ware, New York City
Gymnasium, Colgate University, Hamilton
Marymount Convent, Tarrytown-on-Hudson
Dormitory, Lingnan College, Canton, China

J. Foster Warner, Rochester
Aquinas Institute of Rochester, Rochester
Blessed Sacrament School, Rochester
Holy Family School, Auburn

Harold H. Werner, New York City
William Wilson Jr. School No. 6, Mt. Vernon
Washington Junior High School, Mount Vernon
Pennington Elementary School, Mount Vernon

John C. Westervelt, New York City
Laboratory and Greenhouses, Plant Industry Building, and Library Building (not yet built), New York State College of Agriculture, Cornell University, Ithaca

H. Herbert Wheeler, New York City
Chi Psi Lodge, New Haven, Conn.
Chi Psi Lodge, Middlebury, Vt.
Chi Psi Lodge, Middletown, Conn.

J. Russell White, Albany
Greenville Central School, Greenville
Bolton Central School, Bolton Landing
Indian Lake Central School, Indian Lake

Frederic P. Wiedersum, Valley Stream
Valley Stream High School, Central High School District No. 1, Valley Stream
Malverne Grade School, Union Free School District No. 12, Malverne
Albany and Columbus Schools, Union Free School District No. 9, Freeport

Samuel De P. Williams, Ogdensburg
Six-room Grade School, Massena
Eight-room Grade School, Massena
Waddington High School, Waddington

York & Sawyer, New York City
Kendrick House, Vassar College, Poughkeepsie
Starr Memorial Library, Middlebury College, Middlebury, Vt.
Dormitory, Rutgers University, New Brunswick, N. J.

NORTH CAROLINA

Atwood and Weeks, Inc., Chapel Hill
Graham Memorial Building, University of North Carolina, Chapel Hill
Administration Building, North Carolina College for Negroes, Durham
High School, Morehead

Harry Barton, Greensboro
Senior High School, High Point
Auditorium, North Carolina College for Women, Greensboro
Music Building, North Carolina College for Women, Greensboro

Benton & Benton, Wilson
Selma Public School, Selma
North Carolina School for the Deaf, Morgantown
Appalachian State Teachers College, Boone

G. R. Berryman, Raleigh
Seven buildings, East Carolina Teachers College, Greenville
Eastern Carolina Training School for Boys, Rocky Mount
Six buildings, State School for the Blind and Deaf, Raleigh

Percy Bloxam, Salisbury
Group of buildings, Catawba College, Salisbury
Seven schools, Rowan County
Two schools, Rutherfordton County

George Watts Carr, Durham
W. G. Pearson School, Durham (Northrup & O'Brien, Associate Architects)
North Durham School, Durham (Northrup & O'Brien, Associate Architects)
Roxboro High School, Roxboro (Northrup & O'Brien, Associate Architects)

William Henley Deitrick, Raleigh
Needham Broughton High School, Raleigh
County School, Carpenter, Wake County
County School, Swift Creek, Wake County

Douglas D. Ellington, Asheville
Senior High School, Asheville
Auditorium, Park Avenue School, Asheville
Central Service Plant, Municipal College, Asheville

Eric G. Flannagan, Henderson
Robersonville High School, Robersonville
Woodland-Olney School, Woodland
Charles Aycock School, Vance County

Ronald Greene, Asheville
High School, Valley Springs
High School, Weaverville
Stevens Lee High School, Asheville

Charles C. Hartmann, Greensboro
Agricultural and Technical College, Greensboro
Lenoir Rhyne College, Hickory
Proximity School, Greensboro

Q. E. Herman, Hickory
Balls Creek Consolidated School, Catawba County
Wittenberg Consolidated School, Alexander County
Minneapolis Consolidated School, Avery County

Charles C. Hook and Walter W. Hook, Charlotte
First unit, Myers Park School, Charlotte
West Wing, Graham High School, Charlotte
Sarah Morrison Building, Queens College, Charlotte

James W. Hopper, Leaksville
Douglas High School, Leaksville
Leaksville Grade School, Leaksville (W. C. Holleyman, Associate Architect)
Leaksville High School, Leaksville (W. C. Holleyman, Associate Architect)

Herbert B. Hunter, High Point
New group of buildings, High Point College, High Point: Administration Building, Science Building, Boys' and Girls' Dormitories
New group of buildings, Elon College, Elon: Administration Building, Auditorium, Christian Education Building, Library Building, and Science Building
New group of eleven buildings (contract awarded for first two), Atlantic Christian College, Wilson

Lynch & Foard, Wilmington
Addition to Pineland School, Salemburg
Stephen's High School, Warsaw
Williston Industrial School, Wilmington

Harold Macklin, Winston-Salem
Colored High School, Winston-Salem
South Park Grammar School, Winston-Salem
Kimberly Park Grammar School, Winston-Salem

M. R. Marsh, Charlotte
Plaza Road School, Charlotte
Fairview Elementary School, Charlotte
Mt. Pleasant High School, Mt. Pleasant

Northrup & O'Brien, Winston-Salem
North Junior High School, Winston-Salem
South Junior High School, Winston-Salem
Columbia Heights Grade School, Winston-Salem

James A. Salter, Raleigh
Franklin Public School, Franklin
Administration Building, Methodist Orphanage, Raleigh
West Raleigh School, Raleigh

Harry J. Simmonds, Greensboro
Colonial School, Thomasville
Washington Street (colored) School, Greensboro
Junior High School, Greensboro

Erle G. Stillwell, Hendersonville
Hendersonville High School, Hendersonville
Dana High School, Dana
Dormitory, Western Carolina Teachers College, Cullowhee

NORTH DAKOTA

Ernest R. Boyd, Jamestown
Washington Grade School, Jamestown
Teachers' Training School, Valley City
Teachers' Training School, Minot

Braseth & Houkom, Fargo
Trades Building, School of Science, Wahpeton
Grade School, Moorhead, Minn.
Physical Education Building, North Dakota Agricultural College, Fargo

Bugenhagen & Molander, Minot
Minot Junior High School, Minot
Velva State Agriculture High School, Velva
Rugby High School, Rugby

Jos. Bell DeRemer, Grand Forks
Liberal Arts Building, University of North Dakota, Grand Forks
St. Mary's Parochial School, Grand Forks
Williston High School, Williston

Gilbert B. Horton, Jamestown
Men's Dormitory, Jamestown College, Jamestown
High School and Grade School, Litchfield, Minn. (J. McG. Miller, Rochester, Minn., Associate Architect)
Bordulac Grade and High School, Bordulac

William F. Kurke Co., Fargo
Central Grade School, Fargo
Agricultural Building, North Dakota Agricultural College, Fargo
Law School Building, University of North Dakota, Grand Forks

H. M. Leonhard, Bismarck
Elgin High School, Elgin
High School Auditorium-Gymnasium, New Salem
High School addition, Beulah

Ritterbush Bros., Bismarck
Roosevelt Grade School, Bismarck
Boys' Dormitory, State Training School, Mandan
Girls' Dormitory, State Training School, Mandan

Ira L. Rush, Minot and Bismarck
Grade School, Minot
Girls' Dormitory, Teachers College, Dickinson
Grade-High School, Makoti

OHIO

A. M. Allen & Co., Cleveland
Charles F. Brush High School, South Euclid
Maple Heights High School, Maple Heights
Southington Township School, Southington

Althouse & Jones, Mansfield
Mansfield Senior High School, Mansfield
Junior High School, Galion
High School, Crestline

Geo. W. Barkman, Hamilton
Three Grade Schools, Hamilton
Hanover Township Centralized School, Butler County
Fairfield Township Centralized School, Butler County

Paul Boucherle, Youngstown
Rutherford B. Hayes Junior High School, Youngstown
Poland Union School, Poland
Y. M. C. A. Educational Building, Youngstown

Jos. N. Bradford, University Architect, Columbus
Ohio State University, Columbus:
Chemistry Building
Administration Building
Education Building

Britsch & Munger, Toledo
Perrysburg High School, Perrysburg
Archbold High School, Archbold
St. Rose de Lima School, Perrysburg

Harry J. Brumenshenkel, Mansfield
Grade and High School, Perrysville
Troy Township Centralized School, Nova
Centralized Grade and High School, Lexington

The Carter-Richards Co., Cleveland
High School addition, Bedford
Ellenwood Grade School, Bedford
Interstate Grade School (heating), Bedford

Charles Frederick Cellarius, Cincinnati
Bond Hill School, Cincinnati
Norwood Junior High School, Norwood
Fairfax School, Plainville Rural School District, Hamilton County

Crowe & Schulte, Cincinnati
Guardian Angels School, Cincinnati
Seton High School and Auditorium, Cincinnati
Physics Building, University of Cincinnati, Cincinnati

F. H. De Aement & Co., Akron
Woodland Grade School, Canton
Springfield Grade and High School, Ellet
Northampton Township Grade School, Summit County

DeVoss & Donaldson, Portsmouth
U. S. Grant Junior High School, Portsmouth
Woodrow Wilson Elementary School, Portsmouth
Waverly High School, Waverly

Gustave W. Drach, Inc., Cincinnati
Victoria Hall (Nurses' Training School), Good Samaritan Hospital, Cincinnati
Heberle School, Cincinnati
Gymnasium and Auditorium Building, St. Bernard School, St. Bernard

Eastman & Budke, Springfield
Science Building, Antioch College, Yellow Springs (Herbert Baumer, Ohio State University, Consultant)
Hayward Junior High School, Springfield
Observatory, Wittenberg College, Springfield

Fechheimer & Ihorst, Cincinnati
Roosevelt Public School, Cincinnati
Group of buildings, Hebrew Union College, Cincinnati
Wilson Memorial Hall, University of Cincinnati, Cincinnati

Charles E. Firestone & Lowell Christman, Canton
John K. Baxter School, Canton
East Canton School, East Canton
Fairmount School, Canton

Fox, Duthie & Foose, Cleveland
Kensington School, Rocky River
Kirtland School, Kirtland
Allen School, Elyria

Charles W. Frank, Akron
Men's Club Building, Oberlin
Twelve Men's Buildings, Oberlin

H. O. Fullerton, Cleveland (also Albany, N. Y.)
Grand Gorge Central School, Grand Gorge, N. Y.
Lyon Mountain School, Lyon Mountain, N. Y.
Worcester Central School, Worcester, N. Y.

Fulton & Taylor, Cleveland
Berea High School, Berea
Parma Junior High School, Parma
Garfield Heights High School, Garfield Heights

Garber & Woodward, Cincinnati
Walnut Hills High School, Cincinnati
Chillicothe High School, Chillicothe
Teachers College and Botany and Zoology Building, University of Cincinnati, Cincinnati

Garfield, Stanley-Brown, Harris & Robinson, Cleveland
Institute of Pathology, Western Reserve University, Cleveland
Music Building, Lake Erie College, Painesville
Science Building and Dormitory, Kenyon College, Gambier

Hubert M. Garriott & John W. Becker, Cincinnati
Riley Junior High School, Logansport, Ind.
Denver Memorial Hall, Wilmington College, Wilmington
Colerain Township High School, Cincinnati

Edwin M. Gee, Toledo
T. A. DeVilbiss High School, Toledo
J. D. Robinson Junior High School, Toledo
Harvard School, Toledo

F. F. Glass, Columbus
Ashville High School, Ashville
Carroll High School, Carroll
Norwich High School, Hilliards

John H. Graham & Co., Cleveland
Laurel School for Girls, Cleveland
Monticello Junior High School, Cleveland Heights
Oxford Grade School, Cleveland Heights

J. C. Grunkemeyer—C. W. Sullivan, Associate, Cincinnati
Cleves Elementary School (with combined auditorium and gymnasium), Cleves
Reading High School and Gymnasium, Reading
Lockland High School, Lockland

Harry Hake, Cincinnati
Library, Cincinnati University, Cincinnati
Law College, Cincinnati University, Cincinnati
Administration Building, Lincoln Memorial University, Harrogate, Tenn.

Lawrence H. Hall, Dayton
Centralized High and Grade School, Pleasant Hill
Centralized High and Grade School, Jeffersonville
High School, Olive Branch, Clark County

Samuel Hannaford & Sons, Cincinnati
Wyoming Grade and High School, Wyoming
High School, Lebanon
Oyler School, Cincinnati

Harpster & Billman, Akron
Portage Junior High School, Barberton
Grant Street School, Cuyahoga Falls
High School, Coventry Township, Summit County

Harsh, Davies & Rubrecht, Inc., Columbus
Miami University, Oxford:
Recitation Building
McGuffy Building
Fisher Hall and Oxford College Building (dormitories)

Geo. M. Hopkinson, Cleveland
John Hay High School, Cleveland
Nathan Hale Junior High School, Cleveland
Robert Fulton Elementary School, Cleveland

Hubbell & Benes Co., Cleveland
Shaker Heights High School, Cleveland
Fenn Building, Y.M.C.A. School of Technology, Cleveland
Swimming Pool, Western Reserve Academy, Hudson

Peter M. Hulsken, Lima; **Lyman T. Strong,** Associate
High School, Celina
High School, Van Wert
LaFayette High School, LaFayette

Hunt & Allan, Cincinnati
Kennedy Heights School, Cincinnati
Pleasant Ridge School, Cincinnati
Service and Stores Building, University of Cincinnati, Cincinnati

Jokel & Lange, Toledo
Mt. Vernon School, Adams Township, Lucas County
Clay School, Oregon Township, Lucas County
Horace Mann School, Washington Township, Lucas County

Keich & O'Brien, Warren
Warren G. Harding High School, Warren
East Junior High School, Warren
West Junior High School, Warren

Clarence A. Kissinger, Youngstown
Grade School, Unity Township, Columbiana County
Grade and High School, Knox Township, Columbiana County
Grade and High School, Middleton Township, Columbiana County

H. F. Kling & Son, Youngstown
N. H. Chaney Junior High School, Youngstown
Boardman High School, Boardman
Mineral Ridge Grade School, Mineral Ridge

William Koehl, Cleveland
St. Augustine's Academy, Lakewood
St. Patrick's School, Cleveland
Brunnerdale Seminary, Stark County

M. M. Konarski, Akron
Ferdinand Schumacher School, Akron
David E. Hill School, Akron
Spicer School, Akron

Kraus & Helmkamp, Akron
St. Charles College, Columbus
St. Mary's High School, Lancaster
St. Sebastian's School, Akron

Kunz & Beck, Inc., Cincinnati
Mt. St. Mary Seminary, North Norwood
St. Joseph School, Covington, Ky.
St. Aloysius School, Elmwood Place

Langdon, Hohly & Gram, Toledo
Marsh Foundation Group, Van Wert; instructors' homes, cottages, Industrial Arts School, power plant, etc.
Westwood Garden School, Washington Township
Addition to Washington Township High School, Trilby

M. P. Lauer, Akron
W. F. Rimer School, Kenmore
Loyal Oak School, Norton Township
Silver Lake School, Silver Lake

The J. E. Lewis Co., Canton
Shadyside High School, Shadyside
Jackson Township High School, Canton
Central High School, Uhrichsville

Office of Charles J. Marr, New Philadelphia
Bolivar High School, Bolivar
Richville School, Massillon
Sugarcreek-Shanesville School, Sugarcreek

W. M. McClure, Dayton
Fairview Grade School, Dayton
Westwood Grade School, Dayton
Washington Grade School, Dayton

Walter R. McCornack, Cleveland
Handley Schools, Winchester, Va.
Hawkin School, Cleveland

Thomas D. McLaughlin & Associates, Lima
Notre Dame College, Cleveland
Junior High Schools, Middletown
High School, Delaware

Miller & Son, Youngstown
McDonald High School, McDonald
Cleveland Grade School, Youngstown
Mentor High School, Mentor

H. C. Millott, Sandusky
Central High School, Bellevue
Grade School and Gymnasium, Sycamore
Grade School, West Perkins Township

Mills, Rhines, Bellman & Nordhoff, Inc., Toledo
Toledo University Group, Toledo
Nazareth Hall (Boys' School), Grand Rapids
Ottowa Hills Elementary and Junior High School, Ottowa Hills

William Mills, Nelsonville
Gallipolis School, Gallipolis
Albany Consolidated School, Albany
Pomeroy School, Pomeroy

Frederick G. Mueller & Walter R. Hair, Hamilton
Junior High School, Hamilton
Catholic High School, Hamilton
Centralized School, Liberty Township, Butler County

Ralph Murray, Ironton
High School, Raceland, Ky.
High School, Chapmanville, W. Va.
High and Grade School, Coal Grove

Nicklas & Rodrick, Cleveland
Shaw Technical High School, East Cleveland
Rocky River High School, Rocky River
Roosevelt Grammar School, South Euclid

Peterson & Clarke, Steubenville
Grant Junior High School, Steubenville
Toronto High School, Toronto
Cross Creek District High School, Follansbee, W. Va.

F. J. Porter, Columbus
Grade School, Wilmington
High School, Ontario
High School, Ludlow, Ky.

Potter-Gabele & Co., Cleveland
St. Mary's Parochial Grade and High School, Massillon
St. John the Baptist School and Auditorium, Akron
St. Benedict's Auditorium, Cleveland

Vernon Redding & Associates, Mansfield
Lincoln Junior High School, Canton
High School, Shelby
High School, Ashland

Robert R. Reeves, Columbus
Bexley Elementary and Junior High School, Columbus
Bexley Senior High School, Columbus
Upper Arlington School, Upper Arlington, Columbus (Howard Dwight Smith, Associate Architect)

George B. Rheinfrank, Toledo
Maumee High School, Maumee
Chemical Laboratory, Defiance College, Defiance
Rossford Grade School, Rossford

Richards, McCarty & Bulford, Columbus
Ada Junior-Senior High School, Ada
High School, Canal Winchester
Four Marion Township schools, Franklin County

Ronan & Ingleson, Inc., Columbus
Teachers' Training Building, Kent State College, Kent
Ascension Hall, Kenyon College, Gambier
High School and Auditorium, Oxford

F. S. Rusk, Columbus
Ripley Junior-Senior High School, Ripley
Warren Consolidated High School, Tiltonsville
New Concord High School, New Concord

Morris W. Scheibel & Wilbert H. Shaffer, Youngstown
Stambaugh School, Youngstown
Scienceville High School, Youngstown
Coitsville Township Schools, Youngstown

Schenck & Williams, Dayton
Roosevelt High School, Dayton
Oakwood High School, Oakwood Village, Dayton
Oakwood Grade School, Oakwood Village, Dayton

Charles S. Schneider & Francis Hirschfeld, Cleveland
Ludlow School, Shaker Heights, Cleveland
Fernway School, Shaker Heights, Cleveland
Lomond School, Shaker Heights, Cleveland

Granville E. Scott, Norwalk
High School, Willard
Washington High School, Utica
Jackson High School, Jackson

J. F. Sheblessy, Cincinnati
St. Bonaventura School, Cincinnati
St. Rita School for Deaf, Lockland
Roger Bacon High School, St. Bernard

S. H. Shively & Son, Fremont
Three Elementary Schools, one Junior High School, Fremont
Centralized School, Washington Township
Centralized School, Bettsville

Howard Dwight Smith, Columbus
One Senior High School and three Junior High Schools, Columbus
Gymnasium and Field House, Wittenberg College, Springfield (Miller & Reeves, Associate Architects)
Orton Memorial Laboratory, Columbus (Miller & Reeves, Associate Architects)

Smull & Unger, Ada
John H. Taft Gymnasium, Ohio Northern University, Ada
College of Law Building, same
Holmes-Liberty High School, Bucyrus

S. P. Stewart & Son, Bowling Green
Practical Arts Building, Bowling Green State College, Bowling Green
Senior High School, Bowling Green
Malinta-Grelton Grade and High School, Malinta

James William Thomas, Cleveland
Library, Ohio University, Athens
Memorial Auditorium, Ohio University, Athens
Taft School, Lakewood

Tietig & Lee, Cincinnati
Sayler Park School, Cincinnati
Kilgour School, Cincinnati
Addition to Hughes High School, Cincinnati

William Unger, Bucyrus
New Washington Rural School, New Washington
Jefferson Rural School, Leesville
John H. Taft Gymnasium, Ohio Northern University, Ada

Walker & Norwick, Dayton
Fairmont High School, Dayton
Fairview High School, Dayton
North Olmsted High School, North Olmsted, Cleveland

Warner & Mitchell, Cleveland
Group of buildings, University of Kentucky, Lexington, Ky.
Group of buildings (for Board of Education), Ashland, Ky.
Group of buildings (for Board of Education), Cleveland

Richard A. Zenk & Roy T. Campbell, Youngstown
Hubbard Grade School, Hubbard
Gustavus High and Grade School, Gustavus
Conneaut Grade School, Conneaut

OKLAHOMA

Leonard H. Bailey, Oklahoma City
Prague High School, Prague
Hawthorne School, Oklahoma City
Shydler School, Oklahoma City

G. J. Cannon, Ponca City
St. Mary's Parochial School, Ponca City
McKinley Grade School, Ponca City
Roosevelt Grade School, Ponca City

A. C. Davis & Sons, Shawnee
Woodrow Wilson School, Shawnee
Horace Mann School, Shawnee
Grade School, Wewoka

Jos. I. Davis, Oklahoma City
High School, Idabel
Girls' Dormitory and Administration Building, Eastern Oklahoma College, Wilburton
Girls' Dormitory, Oklahoma Baptist University, Shawnee

Arthur Gorman, Bartlesville
Douglass School, Bartlesville
McKinley School, Bartlesville (Felt, Dunham & Kriehn, Kansas City, Mo., Associates)
Garfield School, Bartlesville (Felt, Dunham & Kriehn, Associates)

L. L. Howenstine, Muskogee
High School Gymnasium, Muskogee
Gymnasium addition to West High School, Muskogee
Pershing Ward School, Muskogee

Layton, Hicks & Forsyth, Oklahoma City
William Howard Taft Junior High School, Oklahoma City
Library, University of Oklahoma, Norman
Capitol Hill Senior High School, Oklahoma City

A. J. Love & Co., Tulsa
High School, Wagoner
Barracks Building, Oklahoma Military Academy, Claremore
High School, Skiatook

Donald McCormick, Tulsa
Group of buildings, Cascia Hall, School of the Augustinian Fathers, Tulsa
School and Rectory, St. Francis Xavier Parish, Tulsa
Junior League Home and School for Convalescent Crippled Children, Tulsa

Richard E. Richter, Okmulgee
Checotah Grade School, Okmulgee
Horace Mann Grade School, Okmulgee
Addition to High School, Okmulgee

Albert S. Ross, Ada
Senior High School, Ada
Health Education Building, East Central State Teachers College, Ada
High School, Maud

Leon B. Senter, Tulsa
High School, Ponca City
High School, Okmulgee
Grade Schools, Ponca City

R. W. Shaw, Enid
Central Elementary School, Guthrie
Public School, Waynoka
Gymnasium, Auditorium and Administration Building, Enid School System, Enid

Leland J. Shumway, Tulsa
Red Fork School, Tulsa
Carbondale School, Tulsa
Dawson School, Tulsa

H. O. Valeur & Co., Muskogee
Junior High School, Muskogee
Grade School, Stone Bluff
Negro High School, Muskogee

J. B. White, Ardmore
Junior High School, McAlester
Junior High School, Durant
Junior High School, Wynnewood

OREGON

C. N. Freeman, Portland
Beaverton High School and Gymnasium, Beaverton, Washington County
Oakridge High School, Oakridge, Lane County
Union High School, District No. 1, Benton County

Francis B. Jacobberger, Portland
Gymnasium Building, St. Mary's High School, Beaverton
St. Vincent's School of Nursing, Portland
Marylhurst College, Oswego

George H. Jones, Portland
High School of Commerce, Portland
John L. Vestal School, Portland
Rigler School, Portland

Knighton & Howell, Portland
Group of buildings, U. S. Grant High School, Portland
Junior High School, Salem
Senior High School, Medford (associated with Frank C. Clark, Medford)

Lawrence, Holford, Allyn & Bean, Portland
Campus layout, University of Oregon, Eugene: Museum of Fine Arts, Basketball Pavilion, Men's Dormitory
Clinic Building, University of Oregon Medical School, Portland
Parkrose High School, Parkrose

Harold D. Marsh, Portland
Klamath Union High School, Klamath Falls
Roosevelt School, Klamath Falls
Fremont School, Klamath Falls

F. Marion Stokes, Portland
Milwaukie Union High School, Milwaukie
Hillsboro High School, Hillsboro
Battle Ground Union High School, Battle Ground, Wash.

Thomas & Mercier, Inc., Portland
Memorial Union Building, Oregon State Agricultural College, Corvallis (W. Marbury Somervell, Associate Architect)
Rainier High School, Rainier
Redmond High School, Redmond

Tourtellotte & Hummel, Portland
High School, Boise, Idaho
High School, Medford
Normal Grade and Training School, Ashland

F. Manson White, Portland
Administration Building; Woodword Hall; Gymnasium, Albany College, Albany
Two Junior High Schools, Eugene
Chapman School, Portland

PENNSYLVANIA

J. E. Adams, Johnstown
Garfield Junior High School, Johnstown
Central Senior High School, Johnstown
Franklin Borough High School, Connemaugh

Harry W. Altman, Uniontown
Ben Franklin Junior High School, Uniontown
Masontown High School, Masontown
South Union Township High School, Uniontown

The Ballinger Co., Philadelphia and New York
Public Grade School, Woodbury, N. J.
Addition to Junior High and Grade School, Marcus Hook
Alpha Sigma Phi Fraternity House, State College

Wm. Pope Barney—Roy W. Banwell, Associate, Philadelphia
The Haverford School, Haverford
Carson College for Girls, Flourton
Extensions, William Penn Charter School, Philadelphia

P. A. Bartholomew, Pittsburgh
Derry Township High School, West Derry
Salina High School, Salina
Southwest Greensburg Junior High School, Greensburg

Francis A. Berner, Pittsburgh
Grade School, Reserve Township, Allegheny County
Phi Gamma Fraternity House, Washington
Chapel and Dormitory, Toner Institute, Pittsburgh

Boyd, Abel & Gugert, Philadelphia
Junior High School, Haverford Township
Rosemont Grammar School and Auditorium, Radnor Township
Manoa Public School, Haverford Township

J. C. Brenton, Charleroi
Junior High School, Charleroi
Consolidated School, Fallowfield Township, Washington Co.
Dry Tavern School, Greene County

George W. Brugger, Canonsburg
Hawthorne School, Canonsburg
First Ward Grade School, Canonsburg
Trinity High School, Washington

Carlisle & Sharrer, Pittsburgh
Aliquippa Senior High School, Aliquippa
Alexander M. Scott Senior High School, North Braddock
Beaver Falls Senior High School, Beaver Falls

Horace W. Castor, Philadelphia
Pennhurst State School, Pennhurst
Upper Darby Township High School, Upper Darby
Four Elementary Schools, Upper Darby

Irwin T. Catharine, Philadelphia
Overbrook High School, Philadelphia
Group of two buildings: Simon Gratz Senior High School and Gillespie Junior High School, Philadelphia
Olney High School, Philadelphia

Harry Charles Child, Sayre (also New York City)
Addition to State Teachers College, Lock Haven
High School, Sayre (Associate Architect; Randall & Vedder, Architects)
Sunday School Unit, First Methodist Episcopal Church, Athens

Cody & Kirby, Erie
West Millcreek High School, Erie County
Lawrence Park Grade and High School, Erie County
Lakewood Grade School, Erie County

Conrad C. Compton, Donora
Donora High School, Donora
Consolidated Grade School, Somerset Township, Washington County
Consolidated Grade School, Jefferson Township, Fayette County

Arthur P. Coon, Scranton
James Madison Grade School, Scranton
Philip Morse Grade School, Scranton
Moscow High School, Moscow

Paul P. Cret, Philadelphia
John Herron Art Institute School, Indianapolis, Ind.
Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia
Barnes Foundation, Merion

W. Holmes Crosby & Co., Oil City
Senior High School, Oil City
Colestock High School, Titusville
Elizabeth Crawford School, Emlenton

Henry D. Dagit & Sons, Philadelphia
St. Madeleine Sophie's School, Philadelphia
St. Richard's School, Philadelphia
Sacred Heart School, Riverton, N. J.

Davis & Dunlap, Philadelphia
Library, West Virginia University, Morgantown, W. Va.
University Demonstration High School, Morgantown, W. Va.
Elementary School, Easttown Township School District, Berwyn

Lester Merritt Davis, Scranton
St. Cyril and Methodius School, Olyphant
Washington School, Throop
New Milford Consolidated High School, New Milford

Office of J. A. Dempwolf, York
Shippensburg High School, Shippensburg
Bachman Memorial Parochial School, New Cumberland
St. John's Parochial School, York

Press C. Dowler, Pittsburgh
Sewickley High School, Sewickley
Dormont High School, Pittsburgh
Knoxville Junior High School, Pittsburgh

W. G. Eckles Co., New Castle
Chapel, Science Building and Dormitory, Grove City College, Grove City
McCartney Library, Geneva College, Beaver Falls
Sewickley Academy, Sewickley

Wilson Eyre & McIlvaine, Philadelphia
Augustinian Preparatory Seminary, Staten Island, N. Y.
Buildings and plan for South Kent School, South Kent, Conn.

G. Cleveland Freeman, Reading
Addition to Porter Township High School, Reinerton
St. Anthony of Padua R. C. School, Easton
St. Peter and Paul R. C. School, Tamaqua

Folsom & Stanton, Philadelphia
St. Louis School, Yeadon
Philip Baker School, Wildwood Crest, N. J.
Primary and Junior High School, Clifton Heights

Fred A. Fuller, Erie
Fairview High School, Fairview
Group of buildings, St. John Kanty College, Erie: Dining Hall, Dormitories and Chapel
Group of buildings, Gannon Hall Boarding School, Erie: Chapel, Dormitories and Classrooms

D. H. Grootenboer—Philip G. Knobloch, Pottsville
Tamaqua High School, Tamaqua
Port Carbon High School, Port Carbon
Schuylkill Haven High School, Schuylkill Haven

John B. Hamme, York
William Penn Senior High School, York
Memorial Library, Gettysburg College, Gettysburg
Dormitory Building, Hood College, Frederick, Md.

Lewis Hancock, Scranton
Consolidated High School, Damascus
Addition to High School, Taylor
Grade School and Gymnasium, Old Forge

Hasness & Albright, Harrisburg
High School and W. H. Ramsey Grade School, Stroudsburg
W. W. Rupert Memorial Grade School, Pottstown
High School, Spring City

Heacock & Hokanson, Philadelphia
Upper Darby Junior High School, Upper Darby Township, Delaware County
Abington Junior and Grade School, Abington Township, Montgomery County
Jenkintown High School, Jenkintown

Thomas K. Hendyx, Bradford
Hobson Place Grade School, Bradford
Two Consolidated Grade Schools, Foster Township, McKean County
Two Consolidated Schools, Bradford Township, McKean County

Hoffman-Henon Co., Philadelphia
La Salle College Group, Philadelphia
Rosemont College Group, Rosemont
Holy Ghost College, Cornwells

Norman Hulme, Philadelphia
Philadelphia College of Pharmacy and Science, Philadelphia
Women's Homeopathic Hospital and Nurses' Training School, Philadelphia
Church School, Western Presbyterian Church, Washington

Hunter & Caldwell, Altoona
Fairview Grade School, Altoona
Consolidated School, Alexandria
Junior High School, Irwin

Ingham & Boyd, Pittsburgh
Training School for Teachers, Board of Education, Pittsburgh
Administration Building, same
Group of buildings, Shady Side Academy, Pittsburgh: Dining Hall, Dormitory and Gymnasium

Jacoby & Everett, Allentown
Dormitory, power plant and mess hall and President's residence, Cedar Crest College, Allentown
High School, Grade School, Nurses' College and Hospital, Sacred Heart Diocese, Allentown
Francis D. Raub Junior High School, Allentown

Janssen & Cocken, Pittsburgh
Hygeia Hall, College of Wooster, Wooster, Ohio
School, Annunciation Parish, Pittsburgh
Alumni Hall, University of Pittsburgh, Pittsburgh

Emil R. Johnson & Clarence F. Wilson, Uniontown
Physical Education Building, State Teachers College, California
Addition to Uniontown Senior High School, Uniontown
Charles E. Boyle Elementary School, Uniontown

Kaiser, Neal & Reid, Carlton Strong Associates, Pittsburgh
Physical Education Building, Seton Hill College, Greensburgh
St. Basil Parish School, Pittsburgh
Activities Building, Mt. Mercy Academy, Pittsburgh

Karcher & Smith, Philadelphia
Women's Fraternity Lodges and Bond Memorial Building, Swarthmore College, Swarthmore
Clothier Auditorium, Swarthmore College, Swarthmore
Chi Phi Fraternity House, Franklin and Marshall College, Lancaster

Lawrie & Green, Harrisburg
Senior High School, Hazleton
Beatty Junior High School, Warren
Gymnasium Building, State Teachers College, Indiana

Edward B. Lee, Pittsburgh
Morgantown High School, Morgantown, W. Va.
Clifford B. Connelley Trade School, Pittsburgh
Washington High School, Washington

W. H. Lee, Philadelphia
Temple University College Building, Philadelphia
Temple University Medical School, Philadelphia
Temple University Union, Philadelphia

C. Howard Lloyd, Harrisburg
William Penn High School Group, Harrisburg
Auditorium and Gymnasium, High School, Steelton
Auditorium and Gymnasium, High School, Trerorton

Albert George Lowe, Pittsburgh
Highland Public School, West View
Junior High School, West View
Ridgewood Public School, West View

Mack & Sahm, Wilkes-Barre
Kingston High School, Kingston
West Pittston Junior and Senior High School, West Pittston (Collaborating Architect, Thomas H. Foster)
Pringle Grade School, Kingston

Magaziner, Eberhard & Harris, Philadelphia
Arter Hall, Allegheny College, Meadville
Murphy College Group, Sevierville, Tenn.: Administration Building, Recitation Hall, Boys' and Girls' Dormitories and Chapel
East Maine Conference Seminary, Bucksport, Me.

A. Oscar Martin & Son, Doylestown
Bensalem Township High School, Cornwells
New Hope High School, New Hope
Newtown High School, Newtown

J. M. McCollum, Pittsburgh
Centennial School, McKeesport
High School, Washington
Wilkins School, Swissvale

Mellor & Meigs, Philadelphia
Auditorium and Music Wing, Bryn Mawr College, Bryn Mawr
Science Hall, Haverford College, Haverford
Gymnasium, Pennsylvania Institute for the Deaf, Mount Airy, Philadelphia

Meyers & Johnson, Architects and Engineers, Erie
Art and Science Building, State Teachers College, Edinboro
Jefferson Grade School, Erie
Strong Vincent High School, Erie

Minick & Eden, Harrisburg
Millersburg Junior-Senior High School, Millersburg
Camp Hill Grade School, Camp Hill
State College High School, State College

C. R. Moffitt, McKeesport
Walnut Street School, Archer Street School, 9th Avenue School and Market Street School, McKeesport
Hebrew Institute, McKeesport
Sacred Heart School, McKeesport

Paul Monaghan, Philadelphia
Science and Engineering Building, Villa Nova College, Villa Nova
Mt. St. Joseph's College for Women, Chestnut Hill
Library and Dormitory, Immaculata College, Frazier

Morris & Erskine, Philadelphia
Friends High School, Moorestown, N. J.
Moses Brown School, Providence, R. I.
Dormitory, Auditorium and Gymnasium, Cheyney Training School for Teachers, Cheyney

Muhlenberg Bros., Reading
Thirteenth and Union Streets Grade School, Reading
Union Township Consolidated Grade School, Ringtown
Albright College Group of new buildings, Reading

Muhlenberg, Yerkes & Muhlenberg, Reading
Four Grade Schools, Reading
Grade School, Lower Alsace Township
High School, Hamburg

Charles R. Peddle, Philadelphia (also Woodbury, N. J.)
Thomas A. Edison School, Westmont, N. J.
Stoy School, Westmont, N. J.
Bettlewood School, Westmont, N. J.

Emile G. Perrot, Philadelphia (also New York City)
Library, Fordham University, Fordham, N. Y.
Dormitory, Georgetown University, Washington, D. C.
Academy of the Sisters of the Order of St. Dominic, Newburgh, N. Y.

John H. Phillips, Pittsburgh
Miles Bryan High School, McKees Rocks
Margaret Bell Miller School, Waynesburg
High School, Springdale

Price & Walton, Philadelphia
Philips Memorial Building, State Teachers College, West Chester
Friends School, Atlantic City, N. J.
Dormitory for Girls, Oak Grove Seminary, Vassalboro, Me.

Thomas Pringle & Oliver J. Robling, Pittsburgh
Linden School, Pittsburgh
Madison School, Pittsburgh
Lincoln School, Pittsburgh

Henry L. Reinhold, Jr., Philadelphia
Academy of the New Church, Bryn Athyn
High School, Windber
Fraternity Houses, State College

Ritcher & Eiler, Reading
Senior High School, Reading
State Teachers College Training School, Lock Haven
Consolidated High School, Williamstown

Ritter & Shay, Philadelphia
Liberty High School, Bethlehem
David Rittenhouse Junior High School, Norristown
Memorial Junior High School, Phoenixville

Ruhe & Lange, Allentown
Library, Muhlenberg College, Allentown
Consolidated School No. 1, Troxell's Crossing, South Whitehall Township
Annex and Gymnasium Buildings, Allentown High School, Allentown

Savery & Scheetz, Philadelphia
Junior High School, Lower Merion Township, Ardmore
Ashland Elementary School, Lower Merion Township, Ardmore
Administration and Senior High School Building, Lower Merion Township, Ardmore

Scholl & Richardson, Reading
Wernersville High School, Wernersville
Frackville High School, Trackville
Amity Township School, Amityville

Schwab, Palmgreen & Merrick, Pittsburgh
Arsenal High School, Pittsburgh
Sumac Street School, McKeesport
Eleventh Ward School, McKeesport

Henry Y. Shaub, Lancaster
George Ross Grade School, Lancaster
Manheim High School
West Lampeter Vocational High School, Lampeter

W. D. Shollenberger, Williamsport
Vocational High School, Williamsport
Montgomery-Clinton School, Montgomery
Junior-Senior High School, Wellsboro

Simon & Simon, Philadelphia
Swedesboro High School, Swedesboro, N. J.
Haddonfield High School, Haddonfield, N. J.
Engineering School, Drexel Institute, Philadelphia

H. Rex Stackhouse & W. W. Donohoe, Philadelphia
North Wildwood High School, North Wildwood, N. J.
A. V. Wood Gymnasium, Brunswick, Ga.
Middle Township High School, Cape May Court House, N. J.

James T. Steen & Sons, Pittsburgh
David B. Oliver Junior-Senior High School, Pittsburgh
Herron Hill Junior High School, Pittsburgh
Prospect Elementary-Junior High School, Pittsburgh

Louis Stevens, Pittsburgh
Grade School, Overbrook, Allegheny County
Dormitory, Polk State School, Polk
Hospital Building, Polk State School, Polk

Stewardson & Page, Philadelphia
Laboratory of Anatomy and Physiological Chemistry, University of Pennsylvania, Philadelphia
Dormitories, University of Pennsylvania, Philadelphia
Graduate School, University of Pennsylvania, Philadelphia

G. W. Stickle, Erie
New group of buildings, Gannon Hall Boarding School, Erie
New building, St. John Kanty College, Erie
New group of buildings, St. Mary's College, North East

Edward Stotz, Pittsburgh
Fifth Avenue High School, Pittsburgh
Coraopolis Junior High School, Coraopolis
Grant School, Bellevue

The Thayer Co., New Castle
George Washington Junior High School, New Castle
Scotland Lane School, Lawrence County
Phillips Hall (girls' dormitory), Bethany, W. Va.

Robert Maurice Trimble, Pittsburgh
Taylor Alderdice High School, Pittsburgh
Taylor Alderdice High School Extension, Pittsburgh
Perry High School Extension, Pittsburgh

Horace Trumbauer, Philadelphia
Two new groups, Duke University, Durham, N. C.
Irvine Auditorium, University of Pennsylvania, Philadelphia
Ogontz School for Girls, Rydal

Van's Engineering Service (Henry M. Rogers, Architect), Blairsville
Ebensburg High School, Ebensburg
Blairsville High School, Blairsville
Washington Township Grade School, Apollo

C. Emlen Urban, Lancaster
Hershey High School, Hershey
West Junior High School, Lancaster
East Junior High School, Lancaster

Walker & Mong, Somerset
High School, Hooversville
Grade School, Cairnbrook, Somerset County
Additions to High School, Somerset

Albert J. Ward, Scranton
Technical High School, Scranton
Grade School No. 42, Scranton
Lincoln School, Blakely

Frank R. Watson, Edkins & Thompson, Philadelphia
Group of buildings, Ursinus College, Collegeville: Dormitory Group, Gymnasium, and Science Hall Dining Hall
Consolidated School, Dover, Del.
Chapel, Muhlenberg College, Allentown (Ruhe & Lange, Associates)

E. H. Wenzelberger, Easton
March Junior High School, Easton
Butztown School, Bethlehem Township School District
Delaware Park School, Lopatcong Township, Warren County, N. J.

Ralph E. White, Philadelphia
Pennwynne Grade School, Pennwynne
Wynnewood Road Grade School, Wynnewood
Bryn Mawr Grade School, Bryn Mawr

Adam G. Wickerham, Homestead
St. Mary Magdalen's School, Homestead
Grade School, Munhall
Junior High School, Homestead

W. Ward Williams, Pittsburgh
Junior High School, Ambridge
High School, Freedom
Anthony Wayne Grade School, Ambridge

Witman & Royer, York
West York High School, West York
Smallwood Grade School, York
Theodore Roosevelt Grade School, York

Eric Fisher Wood & Co., Pittsburgh
Pennsylvania Training School, Morganza
State Teachers College, Mansfield
St. Irenaeus School, Pittsburgh

RHODE ISLAND

Walter F. Fontaine, Woonsocket
Woonsocket Junior High School, Woonsocket
College of Mount St. Charles, Woonsocket
Blackstone High School, Blackstone, Mass.

Joseph A. Hickey, Providence
Sons of Zion (special), Providence
Fairchild (elementary), Miami, Fla.
Velodrome (gymnasium), Hartford, Conn.

Howe & Church, Providence
Infirmary, St. George's School, Middletown
Junior High School, Bristol
Social Building, Brown University, Providence

Monahan & Meikle, Pawtucket
Senior High School, Pawtucket
Goff Junior High School, Pawtucket
Westerly Junior High School, Westerly

John F. O'Malley, Pawtucket
Holy Name Parish School, Providence
Central Falls High School, Central Falls
Assumption Parish School, Providence

Thomas J. Hill Peirce, Providence
Chalkstone Avenue Junior High School, Providence
Hartford Avenue Junior High School, Providence
Bucklin Street Junior High School, Providence

William R. Walker & Son, Providence
Senior High School, Cranston
Rhode Island College of Education, Providence
Junior High School, East Providence

SOUTH CAROLINA

J. G. Cunningham, Greenville
Travelers Rest High School, Travelers Rest
Brevard High School, Brevard
Jonesville High School, Jonesville

Charles William Fant, Anderson
Boys High School, Anderson
Grammar School, Seneca
Dormitory, Presbyterian College, Clinton

H. D. Harrall, Bennettsville
Gymnasium, Elementary School, Bennettsville
High School, Latta
Elementary School, Dillon

David B. Hyer, Charleston
Murray Vocational School, Charleston
North Charleston Graded School, North Charleston
Georgetown High School, Georgetown

J. Carroll Johnson, Columbia
Physics and Engineering Building, University of South Carolina, Columbia
Melton Memorial Observatory, University of South Carolina, Columbia
School of Education, University of South Carolina, Columbia

Rudolph E. Lee, Clemson College
Girls' Dormitory, Lander College, Greenwood
Engineering Building, Clemson Agricultural and Mechanical College, Clemson College
Field House, Clemson Agricultural and Mechanical College, Clemson College

C. Gadsden Sayre, Anderson
Boyden High School, Salisbury, N. C.
Hugh Morson High School, Raleigh, N. C.
Hall Fletcher High School, Asheville, N. C.

J. E. Sirrine & Co., Greenville
Dormitory, Furman University, Greenville
Dining Hall, same
Athletic Building, same

James B. Urquhart, Columbia
Senior High School and addition, Columbia
Hand Junior High School, Columbia
Ellis Avenue School, Orangeburg

W. Paul Williams, Spartanburg
High School, Inman
Colored Grammar School, Spartanburg
Pine Street School, Spartanburg (Associate Architect with Chas. C. Wilson, Columbia)

Charles C. Wilson, Columbia
Greenwood High School, Greenwood (J. C. Hemphill, Associate Architect)
Pine Street Grammar School, Spartanburg (W. Paul Williams, Associate)
High School, Lexington

SOUTH DAKOTA

Walter J. Dixon, Mitchell
Auditorium, Yankton High School, Yankton
Tyndall Grade School, Tyndall
New Underwood Grade and High School, New Underwood

James C. Ewing, Rapid City
Gymnasium-Auditorium, State School of Mines, Rapid City
Jefferson Grade School, Rapid City
Edgemont Grade School, Edgemont

Geo. F. Fossum, Aberdeen
Elementary School, Milbank
Simmons Elementary School, Aberdeen
Addition to High School, Spearfish

Hugill & Blatherwick, Sioux Falls
Gymnasium and Armory Building, University of South Dakota, Vermilion
High School, Belle Fourche
High School, Pierre

F. C. W. Kuehn, Huron
Science Hall, Brookings College, Brookings
Jefferson Grade School, Huron
Wilson Grade School, Huron

Perkins & McWayne, Sioux Falls
Library, State College of Agriculture and Mechanic Arts, Brookings
Student Union Building, University of South Dakota, Vermilion
Washington High School, Sioux Falls

TENNESSEE

George Awsumb, Memphis
South Side High School, Memphis
L. C. Humes High School, Memphis
Hernando Consolidated Grade and High School, Hernando, Miss.

Barber & McMurray, Knoxville
University of Tennessee, Knoxville:
Library Building
(Grant C. Miller, Advisory Architect)
Physical Education Building
Engineering Building

Baumann & Baumann, Knoxville
Knoxville High School, Knoxville
Park City High School, Knoxville
Ausgin High School for Colored, Knoxville

D. R. Beeson, Johnson City
West Side School, Johnson City (Wm. B. Ittner, Consultant)
Rutledge High School, Rutledge
Radford High School, Radford, Va.

Coile & Cardwell, Johnson City
Library, State Teachers College, Johnson City
Martha Wilder School, Johnson City (Wm. B. Ittner, Consultant)
Martin's Chapel School, Erwin

William Crutchfield, Chattanooga
Library, Du Bose Church Training School, Monteagle
Alton Park Elementary School, Chattanooga
Anna B. Lacey School, Hamilton County

Allen N. Dryden, Kingsport
High School, Blountville
High School, Bluff City
Consolidated School, Sullivan County

R. H. Hunt Co., Chattanooga
McFarlin Memorial Auditorium, Southern Methodist University, Dallas, Texas
Training School, East Tennessee State Teachers College, Johnson City
Brainerd Junior High School, Chattanooga

Clarence T. Jones, Chattanooga
Clara Carpenter School, Chattanooga
Morristown High School, Morristown
Lookout Mountain School, Lookout Mountain

Manley & Young, Knoxville
Administration Building, Tennessee Wesleyan College, Athens
Monroe County High School, Sweetwater
Harriman High School, Harriman

Estes W. Mann, Memphis
Administration Building, State Agricultural College, Jonesboro, Ark. (Petter & McAninch, Associate Architects)
High School, Marked Tree, Ark.
Forrest City High School, Forrest City, Ark.

Marr & Holman, Nashville
Junior High School, Nashville
Senior High School, Nashville
Science Building, State Teachers College, Murfreesboro

Walter R. Nelson, Memphis
Dormitory, Blue Mountain College, Blue Mountain
High School, Baldwin, Miss.
North East Mississippi Junior College, Senatobia, Miss.

M. E. Parmelee, Knoxville
Gymnasium, Mars Hill College, Mars Hill, N. C.
Melrose Dormitory, same
Brown Dormitory, same

Regan & Weller, Memphis
Booker T. Washington Industrial School, Memphis
St. Agnes College Building, Memphis
Father Ryan High School, Nashville

W. H. Sears, Chattanooga
North Chattanooga High School, Chattanooga
H. Clay Evans Grammar School, Chattanooga
Lookout Junior High School, Chattanooga

Gordon L. Smith, Chattanooga
Joseph E. Smith Elementary School, Chattanooga
Addition to Dickinson Junior High School, Chattanooga
North Chattanooga Colored School, Chattanooga

Tisdale & Pinson, Nashville
Science Hall, A. & I. State College, Nashville
Miles Memorial College, Birmingham, Ala.
Lincoln County High School, Fayetteville

Geo. D. Waller, Nashville
Two dormitories, David Lipscomb College, Nashville
Isaac Litton High School, Nashville
Portland High School, Portland

TEXAS

Jos. C. Beck, Beaumont
St. Anthony's Parochial School, Beaumont
Sacred Heart Parochial School, Port Arthur
Most Pure Heart of Mary Parochial School, Mobile, Ala.

Berry & Hatch, Amarillo
Paducah Grade School, Paducah
Friona High School, Friona
Turkey High School, Turkey

Arthur A. Brown, Dallas
State Home High School, Corsicana
Randolph College, Cisco
High School, Farwell

Bryan & Sharp, Dallas
Roger Q. Mills Grade School, Dallas
James S. Hogg Junior High School, Tyler
Orah M. Roberts Junior High School, Tyler

Ralph H. Cameron, San Antonio
McAllen High School, McAllen
Sanderson High School, Sanderson
Carrizo Springs High School, Carrizo Springs

Guy A. Carlander, Amarillo
High and Grade School, Dumas
High School, Childress
Margaret Wills School, Amarillo

David S. Castle Co., Abilene (also San Angelo)
High School and Additions, Abilene
High School, Fort Stockton
High School, Midland

Lamar Q. Cato, Houston
John J. Pershing Junior High School, West University
Alvin High School, Alvin
Woodrow Wilson Elementary School, Houston

W. G. Clarkson Co., Fort Worth
Stripling High School, Fort Worth
Masonic Home School, Fort Worth
North Fort Worth Junior High School, Fort Worth

DeWitt & Washburn, Dallas
Harlingen High School, Harlingen
Woodrow Wilson High School, Dallas (Associate Architects)
Mart High School, Mart

Leo M. J. Dielmann, San Antonio
Gymnasium, St. Mary's University, San Antonio
Gymnasium, Our Lady of the Lake College, San Antonio
San Fernando Cathedral School, San Antonio

Flint & Broad, Dallas
Lagow School, Dallas
Buckner Orphans Home High School, Dallas County
Wheatley School, Dallas

Joseph Finger, Houston
Dayton High School, Dayton
Travis Elementary School, Houston
N. D. Cleveland Elementary School, Houston

Giesecke & Harris, Houston (also Austin)
New group of buildings, Primary-Junior High School; Senior High School and Junior College, Edinburg
New unit, Senior High School, Austin
High School, Brenham

L. A. Glover, Houston
Miller Senior High School, Houston
John Reagan Senior High School, Houston
Jim Deady Junior High School, Houston

Herbert M. Greene, LaRoche & Dahl, Dallas
Laboratory Building, Medical College, Galveston
Garrison Hall, University of Texas, Austin
Chemistry Building, University of Texas, Austin

Hamon & Co., Corpus Christi
Odem High School, Odem
George West High School, George West
Ingle Side High School, Ingle Side

Nat W. Hardy, Corpus Christi
Corpus Christi College, Corpus Christi
Corpus Christi Senior High School, Corpus Christi
Del Mar Grade School, Corpus Christi

Wyatt C. Hedrick, Inc., Fort Worth
Texas Technical College Group, Lubbock: Administration Building, Chemistry Building, Engineering Building (Wm. Ward Watkin, Houston, Associate Architect)

Emmett T. Jackson, San Antonio
Ira Ogden Elementary School, San Antonio
Negro Elementary School, San Antonio
Negro High School, San Antonio

Kelwood Co., Inc., San Antonio
Brownwood Ward School, Brownwood
Los Fresnos School, Los Fresnos
Point Isabel School, Point Isabel

Kerr & Walsh, Amarillo
High School, Plainview
High School, Ralls
Ward School, Plainview

M. C. Kleuser & Co., Dallas
Clinton P. Russell School, Dallas
N. W. Harllee School, Dallas
Junior High School, Stephensville

H. F. Kuehne, Austin
Eight Dormitories and Manual Training Building, Austin State School, Austin
Abernathy High School, Abernathy

Mark Lemmon, Dallas
Thomas Jefferson Junior High School, Port Arthur
Woodrow Wilson High School, Dallas (Associate Architect)
Thomas Jefferson Junior High School, Dallas

Lindsey & Kilmer, Greenville
Grade School, Mineola
High School, Van
Grade School, Van

John M. Marriott, San Antonio
Ward School, San Antonio
Ward School, Laredo
Three Ward Schools, Corpus Christi

McLelland & White, Houston
Park Junior High School, Houston
Galena High School, Houston
Pasadena High School, Houston

Morris, Noonan & Wilson, San Antonio
Harlandale Junior High School, San Antonio
Morrill Elementary School, San Antonio
Highland Park School, San Antonio

Joseph W. Northrop, Jr., Houston
Educational Building, First Evangelical Church, Houston
Educational Building, Trinity Episcopal Church, Marshall
Vocational Building, Taylor School, Houston

Harry A. Overbeck, Dallas
Bowie School, Dallas
City Park School, Dallas
Julia C. Frazier School, Dallas

Page Bros., Austin
High School, Del Rio
High School, Eagle Pass
High School, Hearne

Harry D. Payne, Houston
Bay City High School, Bay City Independent School District
Charles Bender High School, Humble Independent School District
Junior-Senior High School, Huntsville Independent School District

Peters, Strange & Bradshaw, Lubbock and Big Spring
High School, Lubbock
High School, Silverton
High School, Ozona

Phelps & Dewees, San Antonio
Seven Junior High Schools, San Antonio
San Angelo Junior College, San Angelo
Brownsville High School, Brownsville

Rittenberry & Carder, Amarillo
McKinley Grade School, Amarillo
High School, Stratford
High School, Vernon

Paul G. Silber & Co., San Antonio
High School, Alice
Educational Building, First Presbyterian Church, Beeville
Grant School, San Antonio

Shirley Simons, Tyler
Residential Hall, College of Industrial Arts, Denton
Auditorium-Gymnasium, Nacogdoches High School, Nacogdoches
Sulphur Springs Junior High School, Sulphur Springs

Harvey P. Smith, San Antonio
Negro Senior High School, San Antonio
Alamo Heights Elementary and Junior High School, Alamo Heights, San Antonio
Lutheran Concordia College, Austin

Smith & Praeger, Paris
Paris Junior College, Paris
High School, Mt. Pleasant
Ward School, Paris

R. D. Steele, Houston
Sidney Lanier Junior High School, Houston
Jack Yates Colored High School, Houston
Southmore Elementary School, Houston

Maurice J. Sullivan, Houston
Convent of the Good Shepherd, Houston
St. Anne's Parish School, Houston
Incarnate Word Convent, Houston

Arthur E. Thomas, Dallas
High School, Crockett
High School, Carthage
York School, Dallas

Voelcker & Dixon, Wichita Falls
Zundelowitz Junior High School, Wichita Falls
High School, Olney
High School, Hamlin

R. Newell Waters, Weslaco
Lasara School, Lasara
Weslaco School, Weslaco
Mercedes School, Mercedes

Wm. Ward Watkin, Houston
Laboratory of Chemistry, Rice Institute, Houston
Six Junior and Senior High Schools, Houston
Texas Technological College Group, Lubbock

Robert Leon White, Austin
Metallurgical Laboratory, College of Mines, El Paso
Nurses' Home, John Sealy Hospital Medical College, Galveston
Union Building and Auditorium, University of Texas, Austin

UTAH

Ashton & Evans, Salt Lake City
Students' Union Building, University of Utah, Salt Lake City
Gymnasium and Mechanical Arts Building, West Jordan and Riverton
Irving Junior High School, Salt Lake City

Cannon & Fetzer, Salt Lake City
Jackson Junior High School, Salt Lake City
Grantsville High School, Grantsville
Physical Science Building, University of Utah, Salt Lake City

Hodgson & McClenahan, Ogden
Washington Junior High School, Ogden
Polk Elementary School, Ogden
Dormitory, Utah School for the Deaf and the Blind, Ogden

Lenord C. Neilson, Salt Lake City
Webster School, Magna
South Jordan School, South Jordan
Murray High School, Murray

Joseph Nelson, Provo
Dixon Junior High School, Provo
Delta High School, Delta
American Fork High School, American Fork

Scott & Welch, Salt Lake City
South Senior High School, Salt Lake City
Utah State Training School, American Fork
Bingham High School, Bingham

R. C. Watkins, Salt Lake City
Fielding High School, Paris, Idaho
Grace High School, Grace, Idaho
Salina High School, Salina

VERMONT

Frank Lyman Austin, Burlington
Nazareth School, Burlington
Junior High School, Burlington
Shelburne High School, Shelburne

Arthur H. Smith, Rutland
Administration Building and Girls' Dormitory, State Normal Training School, Castleton
Grade School, Cavendish
Grade School, Florence

Walker & Walker, Montpelier
Spaulding High School addition, Barre
Lincoln School, North Barre
Alumni Hall, Norwich University, Northfield

VIRGINIA

Fred A. Bishop, Richmond
Blackstone College for Girls, Blackstone
Hopewell High School, Hopewell
Dupont Elementary School, Hopewell

Calrow, Browne & Fitz-Gibbon, Norfolk
Larchmont School, Norfolk
George Rogers Clark School, Charlottesville
Currituck School, Currituck

Carneal, Johnston & Wright, Richmond
Group for Virginia Polytechnic Institute, Blacksburg
Group for Virginia Military Institute, Lexington

T. J. Collins & Son, Staunton
Gymnasium and Swimming Pool, Augusta Military Academy, Fort Defiance
Gymnasium Building, Fairfax Hall, Waynesboro
Gymnasium, Swimming Pool and Academic Building, Stuart Hall, Inc., Staunton

Eubank & Caldwell, Inc., Roanoke
Forest Park School, Roanoke
Infirmary and Science Hall, Virginia Polytechnic Institute, Blacksburg
Science Hall, Roanoke College, Salem

Frye & Stone, Roanoke
Gymnasium, Roanoke College, Salem
Dormitory, State Teachers College, Farmville
Lucy Addison High School, Roanoke

S. J. Makielski, Charlottesville
Academic Building, Voorhees School, Denmark, S. C.
Dormitories and Trades Building, Voorhees School, Denmark, S. C.
Academic Building, St. Marys School, Memphis, Tenn.

G. R. Ragan, Roanoke
Unicoi County High School, Erwin, Tenn.
Morningside Grammar School, Roanoke
Rock Creek Grade School, Rock Creek, Tenn.

"Charles M. Robinson, Architects," Richmond
Thomas Jefferson High School, Richmond
Williamsburg School, Williamsburg
Washington Hall and Library Building, College of William and Mary, Williamsburg

Louis Philippe Smithey, Roanoke
Wasena School, Roanoke
Addition to Jackson Junior High School, Roanoke
Addition to National Business College, Roanoke

WASHINGTON

Baker, Vogel & Roush, Seattle
Washington High School, Pasco
Federal Way School, King County
High School, Issaquah

Bebb & Gould, Seattle
Group of eleven academic buildings and Library, University of Washington, Seattle
Washington State Normal School Group and Library, Bellingham
St. Nicholas Private School for Girls, Seattle

E. J. Breseman, Tacoma
Captain Robert Gray Junior High School, Tacoma
Morton High School, Morton
Randle Grade and High School, Randle

Chas. I. Carpenter, Spokane
New group of buildings, Ellensburg State Normal School, Ellensburg: Dormitories, Dining Hall, Library and Gymnasium
Grade and High School, Wrangell, Alaska

T. F. Doan, Bellingham
Washington School, Bellingham
Sunny Land School, Bellingham
Birchwood School, Bellingham

John Graham, Seattle
Physics Hall, University of Washington, Seattle
Aeronautics Hall, University of Washington, Seattle
Providence School of Nursing, Seattle

Wm. Mallis, Seattle
Kent High School, Kent
Bremerton High School, Bremerton
Renton High School, Renton

John W. Maloney, Yakima
Franklin Junior High School, Yakima
Washington State Normal School, Ellenburg
Marycliff High School, Spokane

Mock & Morrison, Tacoma
Morton McCarver Intermediate High School, Tacoma
Reconstruction of Puyallup High School and addition to Junior High School, Puyallup
Sumner High School, Sumner

F. A. Naramore, Seattle
James Monroe Junior High School, Seattle
McDermoth Elementary School, Aberdeen
Daniel Bagley Elementary School, Seattle

G. A. Pehrson, Spokane
Priest River School, Priest River
School of the Holy Ghost and St. Anthony, Spokane
Reardan School, Reardan

F. Stanley Piper, Bellingham
Sumas-Nooksack High School, Whatcom County
Ferndale Grade School, Ferndale
Roeder Junior High School, Bellingham

George M. Rasque, Spokane
Cheney High School, Cheney
Burns High School, Burns, Ore.
Lacrosse Junior-Senior High School, Lacrosse

Francis P. Rooney, Spokane
House of the Good Shepherd, Spokane
St. Johns Academy, Colfax
St. Patrick's School, Hilliard

Stanley A. Smith, College Architect, Pullman
Group of buildings, State College of Washington, Pullman: The Commons, Men's Gymnasium and Home Economics Building

Fred B. Stephen, Seattle
Edmonds Grade School, Edmonds
Port Townsend Junior High School, Port Townsend
Port Orchard High School, Port Orchard

Stephen & Brust, Seattle
Mt. Vernon High School, Mt. Vernon
Port Angeles High School, Port Angeles
Sedro Woolley High School, Sedro Woolley

Arch M. Torbitt, Seattle
Anacortes High School, Anacortes
St. Helen's School, Longview
Kessler School, Longview

Whitehouse & Price, Spokane
West Valley High School, Millwood
Arlington Grade School, Hillyard, Spokane
Russell Grade School, Moscow, Idaho

Jos. H. Wohleb, Olympia
William Winlock Miller High School, Olympia
Irene S. Reed High School, Shelton
Garfield Grade School, Olympia

WEST VIRGINIA

Albert F. Dayton, Wheeling
Boggs Run Grade School, Benwood
McMechen Grade School, McMechen
Union High School Annex, Benwood

Levi J. Dean, Huntington
Wahama High School, Mason
Lavalette High School, Wayne County
Butler District High School, Fort Gay

William Francis Diehl, Huntington
Douglas Senior and Junior High School, Huntington
Grant High School, Grant District, Cabell County, Milton
Barboursville High School, Barboursville

Frederic Faris, Wheeling
Elm Grove Grade and Junior High School, Elm Grove, Wheeling
Madison School addition, Wheeling
West Liberty State Normal School, West Liberty

S. W. Ford, Clarksburg
Mannington High School, Mannington
Bridgeport High School, Bridgeport
Eagle District High School, Lumberport

Frampton & Bowers, Huntington
Martinsburg High School, Martinsburg
High School, Pineville
Harper's Ferry High School, Harper's Ferry

Edward Bates Franzheim, Wheeling
Warwood High School, Wheeling
Chemistry Building, Bethany College, Bethany
Colored Grade School, Triadelphia

Garry & Sheffey, Bluefield
Institute Grade School, Beckley
Ramsey Junior High School, Bluefield
Big Creek District High School, War

E. C. Holmboe, Clarksburg
Kelley Miller High School, Clarksburg
Charles Town High School, Charles Town
North View Junior High School, Clarksburg

Elmer F. Jacobs, Morgantown
Daybrook High School and Gymnasium, Daybrook
Blacksville High School Gymnasium, Blacksville
Walkersville High School Gymnasium, Walkersville

Alexander B. Mahood, Bluefield
Welch High School, Welch
Beaver High School, Bluefield
Classroom and Administration Building, Bluefield Institute, Bluefield

Meanor & Handloser, Charleston
Cammack Junior High School, Huntington
Marshall College Library, Huntington
Dormitories, Morris Harvey College, Huntington

Carl Reger, Morgantown
Upshur County High School, Buckhannon
Agnes Howard Hall, West Virginia Wesleyan College, Buckhannon
St. Peters R. C. Parochial School, Fairmont

Edward J. Wood & Son, Clarksburg
Sutton High School, Sutton
Weston Grade School, Weston
Flemington High School, Flemington

WISCONSIN

Auler, Jensen & Brown, Oshkosh
Longfellow School, Ripon
Smith School, Oshkosh
Merrill School, Oshkosh

N. P. Backes, Milwaukee
St. Elizabeth School, Milwaukee
Holy Cross School, Milwaukee
St. John's School, Marshfield

Balch & Lippert, Madison
Three buildings, Winnebago Indian School, Neillsville
Religious Educational Building, Swiss Reformed Church, New Glarus

Peter Brust, Milwaukee
Mercy High School, Milwaukee
Mission School, Tsingtao, China
Salzmann Hall, Pio Nono High School, St. Francis

Eschweiler & Eschweiler, Milwaukee
Emanuel Philipp School, Milwaukee
St. Thomas Aquinas School, Milwaukee
Lake Bluff Grade School, Shorewood

Flad & Moulton, Madison
St. Mary's School, Janesville
St. Joseph's School, Racine
Nakoma School, Madison

Foeller, Shober & Berners, Green Bay
East Side High School, Green Bay
Vocational School, Green Bay
Port Washington High School, Port Washington

Herbst & Kuenzli, Milwaukee
Mount Mary College Group, Milwaukee
Wauwatosa High School Group, Wauwatosa
Shorewood High School Group, Shorewood

Frank J. Hoffman, Racine
Vocational School, Racine
Sturtevant Grade School, Sturtevant
St. Rose Parochial School, Racine

Ferd. L. Kronenberg, Madison
Addition to Emerson School, Madison
St. Peter's School, Beaver Dam
St. Xavier School, Cross Plains

Law, Law & Potter, Madison
West High School, Madison
Western Avenue School, Janesville
Ringold Grade School, Janesville

Lindl & Schutte, Inc., Milwaukee
St. Vincent's Parochial School, Oshkosh
Washington High School, West Allis
Woodrow Wilson Grade School, West Allis

J. Mandor Matson, Racine
William Horlick High School, Racine
St. Bonaventure Gymnasium, Sturtevant
Roosevelt Elementary School, Racine

Otto A. Merman, La Crosse
High School, Cashton
Beloit Vocational School, Beloit
La Crosse Vocational School, La Crosse

Oppenhamer & Obel, Green Bay
Junior High School, Wausau
Elementary School, Wausau
High School, Sheboygan Falls

Parkinson & Dockendorff, La Crosse
Junior High School, South Milwaukee
Junior High School, Waukesha
Catholic Central High School, La Crosse

Arthur Peabody, Madison
Memorial Union, University of Wisconsin, Madison
Service Memorial Institutes (medical laboratory), Madison
Practice School, State Normal School, Oshkosh

Mark F. Pfaller, Milwaukee
Addition to St. Agnes Church and School Building, Milwaukee
St. Dominic's School, Sheboygan
St. Anthony's School, Milwaukee

William J. Raeuber, Manitowoc
St. Paul's School, Manitowoc
St. Mary's School, Clarks Mills, Manitowoc County
Vocational School, Manitowoc

Charles Clark Reynolds, Green Bay
West Senior High School, Green Bay
Menekaunee Elementary School, Marinette
De Pere High School, De Pere

Smith & Brandt, Manitowoc (also Appleton)
High School, New London
Kiel Grade and High School, Kiel
Adams-Friendship High School, Adams

Starck & Schneider, Madison
Franklin School, Madison
Baraboo High School, Baraboo
Evansville High School, Evansville

Frank J. Stepnoski, Fond du Lac
St. John's Catholic School, Little Chute
Lincoln Junior High School, Fond du Lac
St. Peter's Catholic School, Stevens Point

Edward Tough, Madison
Dudgeon Grade School, Madison
Randall Junior High School, Madison
Watertown High School addition, Watertown

Martin Tullgren & Sons, Milwaukee
West Milwaukee High School, West Milwaukee
Humboldt Avenue Public School, Whitefish Bay
Richards Street School, Whitefish Bay

Bruce Uthus, Milwaukee
St. Elizabeth School, Milwaukee
St. Veronica School, Milwaukee
St. Sebastian School, Milwaukee

Thomas S. Van Alyea, Milwaukee
St. Johns Military Academy, Delafield:
Memorial Chapel
Hazel Wood Hall
Smythe Hall

Van Ryn & De Gelleke, Milwaukee
Central Vocational School, Milwaukee
Milwaukee University School, Milwaukee
Sol. Juneau High School, Milwaukee

Carl Volkman, Eau Claire
High School, Bloomer
St. Charles Parochial School, Chippewa Falls
St. Patrick's Parochial School, Eau Claire

Guy E. Wiley, Milwaukee
Lincoln High School, Milwaukee
Steuben Junior High School, Milwaukee
Garden Homes Elementary School, Milwaukee

WYOMING

Wilbur A. Hitchcock, Laramie
Laramie High School, Laramie
Men's Dormitory, University of Wyoming, Laramie
Lusk High School, Lusk

CANADA

ALBERTA

W. A. Branton, Calgary
Western Canada High School, Calgary
Technical High School, Calgary
Rideau Park School, Calgary

E. T. Brown, Calgary
Lethbridge Collegiate School, Lethbridge
Hanna High School, Hanna
Kamloops High School, Kamloops, B. C.

H. Story, Edmonton
Cromdale School, Edmonton
Spruce Avenue School, Edmonton
Calder School, Edmonton

Edward Underwood, Edmonton
St. Joseph's Catholic University College, Edmonton
St. Edmunds R. C. Separate School, Edmonton
St. Joseph's Separate School, Edmonton

BRITISH COLUMBIA

Bowman & Cullerne, Vancouver
Norquay School, Vancouver
Chilliwack City School, Chilliwack
Gilmore Avenue School, Burnaby

Harry W. Postle, Vancouver
Vancouver Technical High School, Vancouver (Administration and Academic Building, Auditorium and Gymnasium)
Sir Mathew Begbie School, Vancouver
Addition to Strathcona School, Vancouver

Sharp & Thompson, Vancouver
University of British Columbia group, Vancouver: Science and Library Group; Anglican Theological College: new Tower and Library addition for Union Theological College

MANITOBA

Arthur A. Stoughton, Winnipeg
Arts, Science and Engineering Buildings, University of Manitoba, Winnipeg

W. A. Martin, Winnipeg
Queenston School, Winnipeg
Victoria-Albert School, Winnipeg
Hugh John MacDonald School, Winnipeg (J. H. G. Russell, Associate Architect)

MARITIME PROVINCES

Leslie R. Fairn, Wolfville, N. S.
High School, New Glasgow, N. S.
Kings County Academy, Kentville, N. S.
Pictou Central School, Pictou, N. S.

C. A. Fowler & Co., Halifax, N. S.
Sir Charles Tupper School, Halifax
St. Patrick's Girls' School, Halifax
Nova Scotia Training School, Truro

Major H. E. Gates, Halifax, N. S.
Pathological Institute, Halifax, N. S.
Victoria General Hospital and Medical School of Dalhousie University (for instruction jointly), Halifax, N. S.

H. Claire Mott, Saint John, N. B.
Provincial Normal School, Fredericton
Department of Forestry and Geology, University of New Brunswick, Fredericton
Library Building, University of New Brunswick, Fredericton

A. Edwin Priest, Halifax, N. S.
Chebucto Road School, Halifax
Saint Thomas Aquinas School, Halifax
Sir John S. D. Thompson School, Halifax

ONTARIO

Allaster & Jacques, Windsor
St. Angela R. C. School, Windsor
High School, Athens
St. Claire R. C. School, Windsor

William C. Beattie, Ottawa
St. Patrick's College, Ottawa
Holy Rosary Novitiate, Ottawa
Public School, Cornwall

D. J. Cameron, Windsor
Addition to Windsor-Walkerville Technical School, Windsor
Gilmore School, Sandwich East (Wm. Ralston, Associate Architect)
Kennedy Collegiate Institute, Windsor (Wm. Ralston, Associate Architect)

S. B. Coon & Son, Toronto
Vocational School, North Bay
Vocational School, Oshawa
Etobicoke High School, Islington

Craig & Madill, Toronto
Pembroke Collegiate Institute, Pembroke
Earl Haig High School, Township of North York
Agincourt Continuation School, Agincourt

G. Roper Gouinlock, Toronto
Collegiate Institute and Vocational School, Brockville
East York High School, Toronto
Port Credit High School, Toronto

Hutton & Souter, Hamilton
Delta Collegiate Institute, Hamilton
Cathedral High School, Hamilton
Oshawa Collegiate School, Oshawa

B. A. Jones, Kitchener
College for Congregation of the Resurrection, North Bay
Sheppard Public School, Kitchener
St. John's (separate) School, Kitchener

Norman A. Kearns, Welland
Technical School, Welland
Mathews School, Crowland
Vinny School, Humberstone

Lucien Leblanc, Ottawa (also Montreal, Que.)
Normal School, University of Ottawa, Ottawa
Normal School, R. R. SS. Grises de la Croix, Hull, P. Q.
Garneau (Separate) School, Ottawa

Albert J. Lothian, Windsor
Assumption College, Classroom Building, Sandwich
St. Bernard School, East Windsor
St. Joseph School (public school), Ford City

Mathers & Haldenby, Toronto
Whitney Hall, University of Toronto, Toronto
Botany Building, University of Toronto, Toronto
School of Hygiene, University of Toronto, Toronto

Nichols, Sheppard and Masson, Windsor
John Campbell Public School, Windsor
Gordon McGregor Public School, Ford City
Hugh Beaton Public School, Walkerville

E. H. Paisley, Toronto
St. Andrews College (for boys), Aurora
Ridley College—Lower School for Boys, St. Catherines
St. Andrews College—Lower School, Aurora

Pennington & Boyde, Windsor
St. Peter's Seminary, Windsor
Walkerville Collegiate Institute, Walkerville
Havry Guppy School. Windsor

Richards & Abra, Ottawa
St. John's Separate School, Perth
Prescott High School, Prescott
R. C. Separate School, Renfrew

William Lyon Somerville, Toronto
McMasters University Group, Hamilton: University Hall, Science Building, Men's Residence, Women's Residence, Refectory
(J. Francis Brown & Son, Toronto, Associate Architects)

Sproatt & Rolph, Toronto
Emanuel College, Victoria University, Toronto
Bishop Strachan School, Toronto
Emanuel College Residences, Victoria University, Toronto

QUEBEC

Louis N. Audet, Sherbrooke
Seminary, Three Rivers
(Asselin & Denoncourt, Associate Architects)
St. Mary Academy, Sherbrooke
St. Michael's Academy, Chatham, N. B.

David R. Brown, Montreal
Chemistry Building, University of Saskatchewan, Saskatoon, Saskatchewan
Field Husbandry Building, University of Saskatchewan, Saskatoon, Saskatchewan
Rosemount School, Montreal

Alcide Chaussé, Montreal
Convent, Granby
Stadacona School, Montreal
College, Maniwaki

Chas. David, Montreal
Holy Cross School, Montreal
St. Etienne School, Montreal
Laboratories, Ecole Polytechnique, University of Montreal, Montreal

J. Raoul Gariépy, Montreal
Cartierville School, Montreal
Cornwall School, Cornwall, Ont.
St. Scholastic Convent, St. Scholastique

Gordon & Thompson, Montreal
West Hill High School addition, Montreal
Willingdon School, Montreal (Consulting Architect)
Barclay School, Montreal

Henri Talbot Gouin, Montreal
Mont Carmel School, Montreal
Madeleine de Verchires School, Montreal
Notre Dame de Grâce School, Montreal

Anastase Gravel, Verdun
Ecole Maternelle, Verdun
Couvent de Rigaud, Rigaud
Ecole Notre-Dame de Lourdes, Verdun

Lamontagne, Gravel & Brassard, Chicoutimi
Couvent des Petites Franciscaines, Chicoutime
Ecole Industrielle, Chicoutime
Ecole Industrielle, Malbaie

Pierre Lèvesque, Quebec
Seminary of Gaspé, Gaspé
Agricultural School, Rimouski
Ursulines Convent, Gaspé

Nobbs & Hyde, Montreal
Pulp and Paper Research Institute, McGill University, Montreal
Henry J. Garritty School, Verdun
Royal Victoria College Extension, McGill University, Montreal

Alfred Potvin, Montreal
Belmont School, Montreal
St. Hilaire School, St. Hilaire
Rawdon School, Rawdon

J. Aime Poulin, Sherbrooke
Ste. Therese School, Sherbrooke
Catholic High School, Drummondville
St. Maurice College, Thetford Mines

C. A. Reeves, Montreal
Academie du St. Nom de Marie, Montreal
Academie de Lasalle, Montreal
Academie Jeanne d'Arc, Montreal

Richer & Bournet, St. Hyacinthe
Seminary of St. Hyacinthe, St. Hyacinthe
Mercier School, St. Hyacinthe
Larocque School, St. Hyacinthe

Eugene St. Jean, Montreal
Ste. Cecile School, Montreal
(J. Albert Larue, Outremont, Associate Architect)
St. Vincent-Ferrier School, Montreal
(J. Albert Larue, Outremont, Associate Architect)
St. Gerard School, Montreal

Joseph Sawyer, Montreal
Seminaire de Mont Laurier, Mont Laurier
Ecole Saint Louis de Gonzague, Montreal
Ecole Normale, for RR. SS. Grises de la Croix, Ville Marie

D. J. Spence, Montreal
Catholic High School, Montreal
Sacred Heart Convent School, Montreal
Sacred Heart Convent School, Sault au Recolet

C. R. Tetley, Montreal
Lachine High School, Montreal
Central Park Elementary School, Montreal
George Esplin School, Montreal

Edward J. Turcotte, Montreal
St. Brendan School, Montreal
St. Francis School, Longue Pointe
St. Anthony School, Montreal

Ludger Venne, Montreal
Vianney School, Montreal
Sacred Heart Novitiate, Granby
O'Connell School, Montreal

Viau & Venne, Montreal
St. Mary's Academy, Windsor
Mother-House, Sisters of the Holy Names, Montreal
Dollier de Casson School, Montreal

SASKATCHEWAN

Frank P. Martin, Saskatoon
Pleasant Hill School, Saskatoon
City Park Collegiate, Saskatoon
Saskatoon Technical Collegiate, Saskatoon

F. H. Portnall, Regina
Thomson Public School, Regina
Davin Public School, Regina
Herchmer Public School, Regina

Puntin, O'Leary & Coxall, Regina
St. Augustine School, Regina
Holy Rosary School addition, Regina
Lakeview School addition, Regina

W. G. Van Egmond and Stan. E. Storey, Regina
Balfour Technical School, Regina
Collegiate Institute, Regina
Normal School, Regina

Section XIII

LANDSCAPE ARCHITECTS
FOR UNIVERSITY AND SCHOOL PROJECTS

The following directory is restricted to fellows or members of the American Society of Landscape Architects who are in independent professional practice and have actually been identified with a number of university or school projects.

Space limitations permit only three listings for each individual or firm, and preclude mentioning either the name of the architect associated or the definite character of the work undertaken for each institution. It is believed that the majority of landscape architects specializing in school and university work are here represented, and that many of the projects listed have had a considerable influence on high-grade professional practice in the planning and planting of school grounds and college campuses throughout the United States.

ALABAMA

R. J. Pearse & Associates, Birmingham
University of Mississippi, Oxford, Miss.
East Mississippi Junior College, Scooba, Miss.
Roosevelt High School, Des Moines, Iowa

CALIFORNIA

Stephen Child, San Francisco
Lowthorpe School of Landscape Architecture for Women, Groton, Mass.
Convalescent Home, Children's Hospital, Wellesley, Mass.
State Normal School, Teachers College, San Jose

Cook, Hall & Cornell, Los Angeles
Pomona College, Claremont
Claremont Colleges, Claremont
University of Hawaii, Honolulu

Charles H. Diggs, Los Angeles
Georgetown University Preparatory School, Washington, D. C.
Mount Vernon Seminary, Washington, D. C.
University of Southern California, Los Angeles

Frederick N. Evans, Sacramento
Sacramento Junior College, Sacramento
Sacramento Public Schools, Sacramento
Woods Grammar School, Woodbridge

Howard Gilkey, Oakland
Santa Rosa Junior College, Santa Rosa
St. Mary's College, Moraga
Modesto Junior College, Modesto

John William Gregg, Berkeley and Los Angeles
Campus development for the University of California at Berkeley, Los Angeles, Riverside and Davis

McKown and Kuehl, Beverly Hills
Iowa State Teachers' College, Cedar Falls, Iowa
Public Schools, Davenport, Iowa
Huntington Beach Union High School, Huntington Beach

H. W. Shepherd, Berkeley
Marysville Union High School and Junior College, Marysville
Branch College of Agriculture, Davis
Davis Union High School, Davis

Paul G. Thiene, Los Angeles
Alhambra High School, Alhambra
Santa Maria Union High School, Santa Maria
Excelsior Union High School, Norwalk

L. Deming Tilton, Santa Barbara
University of Illinois, Urbana, Ill.
State Teachers College, Santa Barbara
Saint Anthony's College, Santa Barbara

COLORADO

S. R. DeBoer, Denver
University of Denver, Denver
Colorado Woman's College, Denver
The Idaho Technical Institute, Pocatello, Idaho

McCrary & Culley, Denver
New Mexico Military Institute, Roswell, N. Mex.
University of Wichita, Wichita, Kans.
University of Wyoming, Laramie, Wyo.

CONNECTICUT

Thomas H. Desmond & Associates, Inc., Simsbury
Westminster School, Simsbury
Miss Porter's School, Farmington
Ethel Walker School, Simsbury

FLORIDA

Frank M. Button, Coral Gables
University of Vermont, Burlington, Vt.
Ponce de Leon High School, Coral Gables
Millikin University, Decatur, Ill. (Partner of Simonds Co.)

Herbert L. Flint, Orlando
Rollins College, Winter Park
Mount Union College, Alliance, Ohio
Newport School, Ironwood, Mich.

ILLINOIS

Jacob L. Crane, Jr., Chicago
Lawrence College, Appleton, Wis.
High School, Ponca City, Okla.
Chicago Board of Education (64 schools)

Chance S. Hill, Chicago
North Central College Campus, Naperville
Downers Grove Community High School, Downers Grove
Maine Township High School, Des Plaines

Simonds & West, Chicago
Iowa State College, Ames, Iowa
Illinois College, Jacksonville
University of Maryland, College Park, Md.

F. A. Cushing Smith & Associates, Chicago
High School Group, Shorewood, Milwaukee, Wis.
St. Joseph's Seminary, Hinsdale
Glenwood Manual Training School, Glenwood

INDIANA

Lawrence V. Sheridan, Indianapolis
Purdue University, Lafayette
St. Mary of the Woods Academy, Terre Haute
Shortridge High School, Indianapolis

IOWA

Philip H. Elwood, Jr., Ames
State University of Iowa, Iowa City
State School for the Deaf, Council Bluffs
Dorothy Love Presbyterian Home, Sidney, Ohio

MASSACHUSETTS

Robert Washburn Beal, Boston
Eldon Keith Field, High School, Brockton
Bowdoin College, Bowdoin Athletic Field, Brunswick, Maine
High School Campus and Athletic Field, Whitman

Harold Hill Blossom, Boston
Beaver Country Day School, Brookline
Amherst College, Amherst
Dedham High School, Dedham

Franklin Brett, Duxbury
Ware High School, Ware
Walpole High School, Walpole
(Brett & Hall, Landscape Architects)
Duxbury High School, Duxbury

Herbert J. Kellaway, Boston
Amherst College, Amherst
Hartford Theological Seminary, Hartford, Conn.
North Junior High School, Quincy

Warren H. Manning Offices, Inc., Cambridge
University of Virginia, Charlottesville, Va.
Western Reserve University, Cleveland, Ohio
North Carolina State College, Raleigh, N. C.

Frederick Kingsbury, Boston
Chicopee High School, Chicopee
Washington Irving School, Boston
The Thomas School, Rowayton, Conn.
Hallam L. Movius, Boston
University of Buffalo, Buffalo, N. Y.
Dalton High School, Dalton
Beaver Country Day School, Brookline
Sam P. Negus, Boston
Notre Dame Academy, Roxbury
St. Gabriel's Parish School, Washington, D. C.
Boston College, Chestnut Hill
John Nolen, Cambridge
Babson Institute, Wellesley
Queens College, Charlotte, N. C.
University of Wisconsin, Madison, Wis.
Olmsted Brothers, Brookline
Phillips Academy, Andover
Denison University, Granville, Ohio
Duke University, Durham, N. C.
Bremer Whidden Pond, Boston
University of New Hampshire, Durham, N. H.
Southern Methodist University, Dallas, Texas
Radcliffe College, Cambridge
William H. Punchard, Boston
Woburn High School Athletic Field, Woburn
Middlebury College, Middlebury, Vt.
Abbot Academy, Andover
Arthur A. Shurcliff, Boston
Amherst College, Amherst
Wellesley College, Wellesley
Mount Holyoke College, South Hadley
Stiles & Van Kleek, Boston
Williams College (golf course), Williamstown
Tufts College (golf course), Medford
Taft School (golf course), Watertown, Conn.
Loring Underwood and Laurence S. Caldwell, Boston
Vassar College, Poughkeepsie, N. Y.
Bates College, Lewiston, Maine
Belmont High School, Belmont
Frank A. Waugh, Amherst
Massachusetts Agricultural College, Amherst
Kansas State Agricultural College, Manhattan, Kans.
New York State Experiment Station, Geneva, N. Y.

MICHIGAN

T. Glenn Phillips, Detroit
Michigan State College, East Lansing
Sacred Heart Seminary, Detroit
University of Detroit, Detroit
Raymond Hill Wilcox, Detroit
Duns Scotus College, Detroit
Starr Commonwealth for Boys, Albion
Grosse Point High School, Grosse Point
Aubrey Tealdi, Ann Arbor
Hillsdale Public Schools, Hillsdale
St. Clair High School, St. Clair
University of Michigan, Ann Arbor
H. O. Whittemore, Ann Arbor
Tappan Junior High School, Ann Arbor
Mack Junior High School, Ann Arbor
Hematite Township High School, Amasa

MINNESOTA

Hugh Vincent Feehan, Minneapolis
Loyola University, Chicago, Ill.
Creighton University, Omaha, Nebr.
Cretin High School, St. Paul
Morell & Nichols, Inc.
University of Minnesota, Minneapolis
Washington State College, Pullman, Wash.
Carleton College, Northfield, Minn.
Charles H. Ramsdell, Minneapolis
Rochester Schools, Rochester
Granite Falls High School, Granite Falls
Le Sueur High School and Recreation Center, Le Sueur

MISSOURI

Hare & Hare, Kansas City
University of Kansas, Lawrence, Kans.
High School Campus, Longview, Wash.
8 Senior and Junior High Schools, Houston, Texas
John Noyes, St. Louis
New Mary Institute, St. Louis County
Washington University, St. Louis
Westminster College, Fulton

NEW JERSEY

Marjorie Sewell Cautley, Ridgewood
Fieldston School Campus, New York City
Tenafly High School Grounds, Tenafly
Roosevelt Common Athletic Field, Tenafly

NEW YORK

Briggs & Stelling, New York
(also Charleston, S. C.)
Colonial School, Pelham
Memorial High School, Pelham
Prospect Hill School, Pelham Manor
A. F. Brinckerhoff, New York
Connecticut College, New London
Bronxville Schools, Bronxville
Tuckahoe High School, Tuckahoe
Brinley & Holbrook, New York
Columbia High School, Maplewood, N. J.
New Jersey State Normal School, Jersey City, N. J.
New Jersey State Teachers College, Trenton, N. J.
Laurie D. Cox, Syracuse
Acadia University, Wolfville, Nova Scotia
New York State College of Forestry, Syracuse
Mamaroneck High School, Mamaroneck
Alling S. De Forest, Rochester
High School and North Street School, Geneva
Villa Chantill, Rock Island, Ill.
Colgate-Rochester Divinity School, Rochester
Mrs. Beatrix Farrand, New York
Princeton University, Princeton, N. J.
Yale University, New Haven, Conn.
University of Chicago, Chicago, Ill.
Bryant Fleming, Ithaca
Cornell University, Ithaca
Dennison University, Granville, Ohio
Toronto University, Toronto, Canada
Francis Hastings Gott, Rochester
Nazareth Convent and Academy, Pittsford
Allen's Creek School, District No. 6, Brighton
Central School, District No. 1, Brockport
Roeder J. Kinkel, Buffalo
Evangelical Training School, Dunkirk
Batavia High School, Batavia
Alfred University, Alfred
Charles Wellford Leavitt & Son, New York
Tome Institute, Port Deposit, Md.
Lehigh University, Bethlehem, Pa.
University of South Carolina, Columbia, S. C.
H. B. Littlefield, North White Plains
High School of White Plains, and Stadium, White Plains
Battle Hill School, White Plains
Horace Greeley High and Graded School, Chappaqua
Charles N. Lowrie, New York
Lawrenceville School, Lawrenceville, N. J
State School for the Deaf, Trenton, N. J.
Oyster Bay Junior High School, Oyster Bay
Carl F. Pilat, New York
Bernards High School, Bernardsville, N. J.
Carteret Academy, Orange, N. J.
Ossining School, Ossining
Richard Schermerhorn, Jr., New York
Union College, Schenectady
St. Anthony's Seraphic Seminary, Catskill
Albany Academy, Albany
Roland Schultheis, Flushing
De Witt Clinton High School, Bronx
High School, Far Rockaway
Grammar School, Forest Hills, L. I.
Ferruccio Vitale—Alfred Geiffert, Jr., New York
University of Illinois, Urbana, Ill.
Pleasantville High School, Pleasantville
Virginia Military Institute, Lexington, Va.

NORTH CAROLINA

E. S. Draper, Charlotte
Winthrop College, State College for Women, Rock Hill, S. C.
Davidson College, Davidson
Agnes Scott College, Decatur, Ga.

OHIO

William Pitkin, Jr., & Seward H. Mott, Inc., Cleveland
University of Michigan, Ann Arbor, Mich.
Wittenberg College, Springfield
Wooster College, Wooster
A. D. Taylor, Cleveland
Carnegie Institute of Technology, Pittsburgh, Pa.
Oregon Agricultural College, Corvallis, Ore.
Mount Union College, Alliance
B. Ashburton Tripp, Cleveland
High School, Parkersburg, W. Va.
High School, Shaker Heights
High School, Cleveland Heights

PENNSYLVANIA

Russell Van Nest Black, Philadelphia
Peddie School, Hightstown, N. J.
Walter Hayes School, Palo Alto, Calif.
Public Schools, Ithaca, N. Y.
Ralph E. Griswold, Pittsburgh
University of Pittsburgh, Pittsburgh (Consultant)
Pennsylvania College for Women, Pittsburgh
(Nicolet & Griswold, Landscape Architects)
Pittsburgh Board of Education, Pittsburgh
(Nicolet & Griswold, Landscape Architects)
Harry B. Hostetter, Lancaster
Linden Hall Seminary for Girls, Lititz
Reformed Theological Seminary, Lancaster
Pennsylvania Soldiers' Orphan School, Scotland
Thomas W. Sears, Philadelphia
Johns Hopkins University, Baltimore, Md.
Pennsylvania State College, State College, Pa.
Durham High School, Durham, N. C.
Wheelwright & Stevenson, Philadelphia
The Gunnery School, Washington, Conn.
St. Andrews School, Middletown, Del.
Muhlenberg College, Allentown

VIRGINIA

Charles F. Gillette, Richmond
Jesuit Novitiate, Wernersville, Pa.
La Salle Peru High School, La Salle, Ill.
State Normal School, Fayetteville, N. C.

WISCONSIN

Phelps Wyman, Milwaukee
Senior High School, Neenah
University of North Dakota, Grand Forks, N. Dak.
State School of Mines, Rapid City, S. Dak.

CANADA

Arthur M. Kruse, Toronto, Ontario
The Boys' Training School, Bowmanville, Ontario
Woodstock College, Woodstock, Ontario
Belleville Institution for the Deaf, Belleville, Ontario

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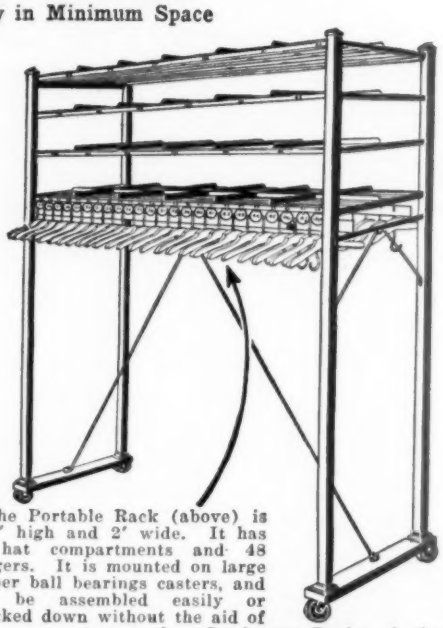

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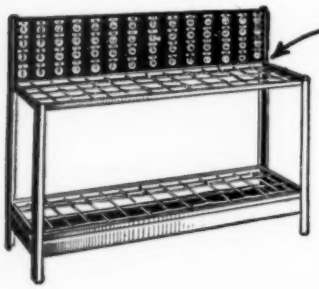

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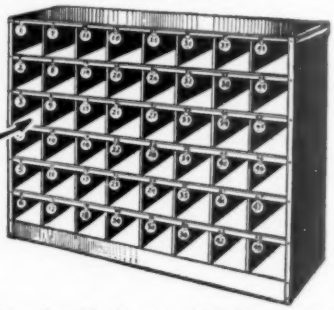

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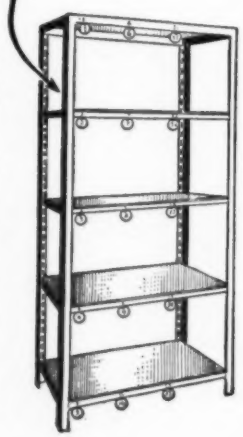

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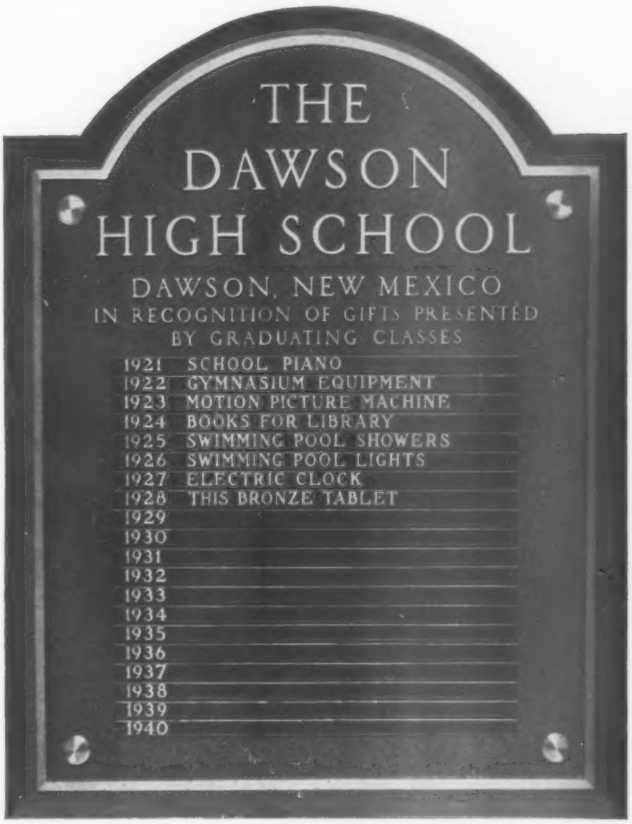

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We furnish all instructions, etc., for use in setting letters which makes it a very simple matter for the local mechanic to install, or we will install if desired.

Write for our booklet showing bronze tablets for all purposes.

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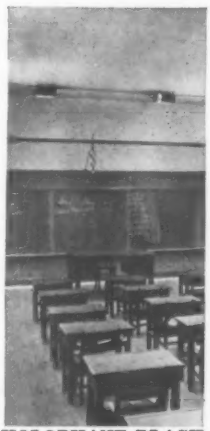

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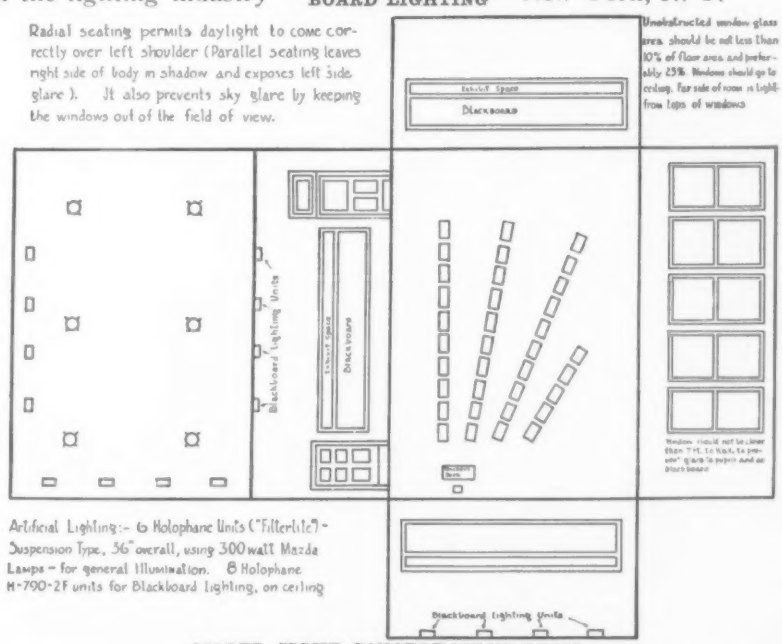
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